September 2010

Sections 53, 54, 55 and 56
Ontario Water Resources Act
R.S.O. 1990

Sample Application Package

for a Certificate of Approval (Sewage Works)

for a Metal Mining Operation

Veuillez noter que ce document n'est disponible qu'en anglais

PIBS 7849e

Protecting our environment. Ontario

Introduction:

This document has been created as an example of a complete Application for Approval for a Certificate of Approval (Industrial Sewage Works). The mining company (Acme Mineral Rights LLC) is used as an illustration and does not exist. Any resemblance to real people, places or events is coincidental and unintended.

This example includes samples of several forms that are required to be completed and submitted when applying for an Industrial Sewage Works Certificate of Approval. To obtain a copy of these documents, please refer to the "publications" section of the Ministry of the Environment Internet site at www.ene.gov.on.ca or contact the Environmental Assessment and Approvals Branch by telephone at 1-800-461-6290 (locally at 416-314-8001) or by email at EAABGen@ene.gov.on.ca.

Forms used in this sample application:

PIBS #	Title
7340	Application for a Approval of Sewage Works
4107	Costs for OWRA s.53 Applications - Supplement to Application for Approval
6238	Pipe data form: Water Main, storm sewer, sanitary sewer, and forcemain Design. Supplement to application for approval for water and sewage works.

Cette publication hautement spécialisée n'est disponible qu'en anglais en vertu du Règlement 411/97 qui en exempte l'application de la Loi sur les services en français. Pour obtenir de l'aide en français, veuillez communiquer avec le Direction des évaluations et des autorisations environnementales au ministère de l'Environnement au 416-314-8001 (sans frais : 1-800-461-6290).

CONSULTING LTD.

Consulting LTD
123 Office Dr.
Someplace, Ontario
A1B 2C3

March 15, 2010

Ministry of the Environment
Environmental Assessment and Approvals Branch (EAAB)
2 St. Clair Avenue West, Floor 12A
Toronto, Ontario
M4V 1L5

Attention: Director, EAAB

Dear Director:

Re: Application for Certificate of Approval (Industrial Sewage Works – Metal Mining Sector)
ACME Mineral Rights LLC
Precious Metals Mine, Copious D'Or, North Nugget County, Ontario

On behalf of ACME Mineral Rights LLC (ACME MR), this application is being made under Section 53 of the Ontario Water Resources Act (OWRA) for the proposed sewage works installation at the ACME MR Precious Metals Mine (Mine) located in Copious d'Or, North Nugget County, Ontario (Site).

ACME MR is proposing to establish sewage works for the collection, treatment, and disposal of up to 2.47 million cubic metres of process water per year, and an estimated 1.75 million cubic meters per year of stormwater run-off to service a service area of 265 hectares. The proposed sewage works will include the following:

- Tailings Management Facility (TMF) which includes the tailings pond and the discharge piping
- a reclamation system for minimizing off-Site discharges and for utilization in operations
- an effluent treatment plant and wetland treatment system prior to discharge into the natural environment
- engineering dams and dykes to manage all water
- a stormwater management system to handle all off-Site run-off and discharges from the Site
- associated structures, instrumentation, electrical, and other facilities to support the aforementioned components

This application is for a new Certificate of Approval (C of A) for the proposed works.

Attached to this cover letter are the completed application forms and various supporting documentation for the above requested approval.

One (1) copy of the application is being submitted to the Environmental Assessment and Approvals Branch of the Ministry of the Environment, and one (1) copy is being submitted to the South Nugget District Office of MOE. Mr. Michael O. Earnest of the South Nugget District Office has been consulted previously regarding this project. Clearances obtained from local municipalities and other regulatory agencies have been included with the supporting documentation including consultations with Aboriginal groups. ACME MR met with the MOE South Nugget Regional District Office of South Nugget on June 12, 2008, and agreed on effluent discharge limits and monitoring requirements in addition to our obligations under O. Reg. 560/94.

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Someplace, Ontario
A1B 2C3

One cheque, payable to the Minister of Finance, for the application fee associated with the requested approval is attached to this cover letter in the amount of $14,200.

Should there be questions on any aspect of this submission, please do not hesitate to contact the undersigned.

Yours truly,

John Schmidt

CONSULTING LTD.

John Schmidt, P.Eng.
Senior Engineer
Jschmidt@ConsultingLtd.com

JS/cg

Attachments:

- Application Fee

- Application for Approval of Industrial Sewage Works (PIBS 3070e03)

Attachment 1: Costs for OWRA s. 53 Applications, Supplement to Application for Approval (PIBS 4107e)

Attachment 2: Summary of Pre-Application Consultation

Attachment 3: Legal Survey and Land Tenure Map

Attachment 4: Proof of Public Consultation

Attachment 5: Design Brief (Attached separately)

Attachment 6: Engineering Design Drawings and Specifications (Attached separately)

Attachment 7: MOE Pipe Data Form, Watermain, Storm Sewer, Sanitary Sewer and Forcemain Design, Supplement to Application for Approval for Water and Sewage Works (PIBS 6238e)

Attachment 8: Description of Proposed Works (Hard copy and Electronic copy as CD)

Attachment 9: Proof of Source Water Protection Consultation

Ontario

Ce formulaire est disponible en français

Ministry of the Environment

Application for Approval of Industrial Sewage Works

For Office Use Only			
Reference Number	Payment Received	Date *(y/m/d)*	Initials
	$		

General Information and Instructions

General:

Information requested in this form is collected under the authority of the *Ontario Water Resources Act,* R.S.O. 1990 (OWRA) and the *Environmental Bill of Rights*, C. 28, Statues of Ontario, 1993, (EBR) and will be used to evaluate applications for approval of industrial sewage works under Section 53 OWRA.

Instructions:

1. When completing this form, please refer to the "Guide for Applying for Approval of Industrial Sewage Works, Section 53, OWRA " (referred to as the Guide) and "Guide - Application Cost for Sewage works, S. 53, OWRA." Questions regarding completion and submission of the application should be directed to the Environmental Assessment & Approvals Branch, 2 St. Clair Avenue West, Floor 12A, Toronto, Ontario, M4V 1L5, telephone number 1-800-461-6290 or (416) 314-8001, or to your local District Office of the Ministry of the Environment.

2. This form must be completed with respect to all the requirements of the Guide in order for it to be considered as an application for approval. INCOMPLETE APPLICATIONS WILL BE RETURNED TO THE APPLICANT.

3. A complete application consists of:
   (1) a completed and signed application form, including the attached "Costs for OWRA S. 53 Application - Supplement to Application for Approval";
   (2) all supporting information as requested by this form and by the Guide, and
   (3) a certified cheque or money order, in Canadian funds, made payable to the *Minister of Finance* for the applicable application fee.
   The Ministry may require additional information during the technical review of any application accepted as complete.

4. The original application, along with the supporting information and the application fee, must be sent to:
   The Ministry of the Environment,
   Director, Environmental Assessment and Approvals Branch,
   2 St Clair Avenue West, Floor 12A, Toronto, Ontario M4V 1L5.
   A copy of the application and the supporting information must be sent to the local Ministry District Office which has jurisdiction over the area where the facilities are located.

5. Information contained in this application is not considered confidential and will be made available to the public upon request. Information submitted as supporting information may be claimed as confidential but will be subject to the *Freedom of Information and Protection of Privacy Act* (FOIPPA) and *EBR*. If you do not claim confidentiality at the time of submitting the information, the Ministry may make the information available to the public without further notice to you.

6. If the Client submits with the application a copy of their Master Business Licence (MBL) obtained from the Ministry of Government Services, the **shaded sections within this form do not need to be completed**. For additional information on the MBL please refer to the "Guide."

1. Client Information

Client Name *(legal name of individual or organization as evidenced by legal documents)*: ACME Mineral Rights LLC (ACME MR)

Business Identification Number:

Business Name *(the name under which the entity is operating or trading if different from the Client Name - also referred to as trade name)*:

Client Type:

- ☐ Corporation
- ☐ Individual
- ☒ Partnership
- ☐ Sole Proprietor
- ☐ Federal Government
- ☐ Municipal Government
- ☐ Provincial Government
- ☐ Other *(describe)*:

Activity Classification Code/Standard Industrial Classification Code *(if unknown please complete Business Activity Description)*: 212200

Business Activity Description *(a narrative description of the business endeavour, this may include products sold, services provided or machinery/equipment used, etc.)*: Gold Mining

Is the client a MISA Discharger? ☒ Yes ☐ No

If Yes, name the industrial sector: Mining

2. Client Physical Address - *Complete A, C and D* **or** *B, C and D*

A. Civic Address - Street information *(applies to an address that has civic numbering and street information - includes street number, name, type and direction)*: 123 Easy St.

Unit Identifier *(identifies type of unit, such as suite & number)*:

B. Survey Address *(used for a rural location specified for a subdivided township, an unsubdivided township or unsurveyed territory)*

Lot and Conc.: used to indicate location within a subdivided township and consists of a lot number and a concession number. Lot: Conc.:

Part and Reference: used to indicate location within an unsubdivided township or unsurveyed territory, and consists of a part and a reference plan number indicating the location within that plan. Attach copy of the plan. Part: Reference Plan:

C. Municipality/Unorganized Township	County/District	Province/State	Country	Postal Code
Copious d'Or	North Nugget	ON	Canada	C3B 2A1

D. Telephone Number *(including area code & extension)*	Fax Number *(including area code)*	E-mail Address
123-555-4653	123-555-7424	RDiamond@acmemr.com

3. Client Mailing Address - *Complete A and C* **or** *B and C*

A. Civic Address - Street information *(includes street number, name, type and direction)*

☒ Same as Client Physical Address

Unit Identifier *(identifies type of unit, such as suite & number)*:

B. Delivery Designator: ☐ Rural Route ☐ Suburban Service ☐ Mobile Route ☐ General Delivery

Delivery Identifier *(a number identifying a Rural Route, Suburban Service or Mobile Route delivery mode)*:

C. Municipality	Postal Station	Province/State	Country	Postal Code

4. Site Information - *(location where activity/works applied for is to take place)*

Site Name	MOE District Office	Legal Description *(attach copy of a legal survey)*
ACME MR Precious Metals Mine	South Nugget	Legal Survey Attached

A. Site Address - Street information *(applies to an address that has civic numbering and street information - includes street number, name, type and direction)*: 12345 Concession 7

☐ Same as Client Physical Address

Unit Identifier *(identifies type of unit, such as suite & number)*:

B. Survey Address *(used for a rural location specified for a subdivided township, an unsubdivided township or unsurveyed territory)* *NOTE:* Do not complete "B" if you completed "A."

Lot and Conc.: used to indicate location within a subdivided township and consists of a lot number and a concession number. Lot: Conc.:

Part and Reference: used to indicate location within an unsubdivided township or unsurveyed territory, and consists of a part and a reference plan number indicating the location within that plan. Attach copy of the plan. Part: Reference Plan:

Non Address Information *(includes any additional information to clarify clients' physical location)*:

Geo Reference

Map Datum	Zone	Accuracy Estimate	Geo Referencing Method	UTM Easting	UTM Northing
NAD83	18	+/- 10 m	GPS	275643.456	4924401.618

Municipality/Unorganized Township	County/District	Postal Code
Copious d'Or	North Nugget	C2B 6B2

Adjacent Land Use

☐ Industrial ☐ Commercial ☐ Recreational ☒ Residential ☐ Agricultural ☐ Other *(specify)*:

Is the Site located in an area of development control as defined by the Niagara Escarpment Planning & Development Act (NEPDA)?

☐ Yes (If Yes, attach copy of NEPDA permit for the proposed activity/work) ☒ No

Is the Client the operating authority? ☒ Yes ☐ No

If No, attach the operating authority name, address and phone number.

Is the Client the owner of the land (site)? ☒ Yes ☐ No

If No, attach the owner's name, address and consent for the installation and operation of the facilities.

Is the Site located on the Oak Ridges Moraine Conservation Area as defined by the Oak Ridges Moraine Conservation Plan (ORMCP), a regulation made under the Oak Ridges Moraine Conservation Act (ORMCA)?

☐ Yes **(If yes please attach proof of Municipal planning approval for the proposed activity/work)**

☒ No

5. Project Technical Information Contact - *Complete A, B, D and E* **or** *A, C, D, and E*

A. Name	Company	☐ Same as Client Name
John Schmidt	Consulting Ltd.	

Contact Address
B. Civic Address - Street information *(includes street number, name, type and direction)* ☐ Same as Client Mailing Address — Unit Identifier *(identifies type of unit, such as suite & number)*

123 Office Drive

C. Delivery Designator: ☐ Rural Route ☐ Suburban Service ☐ Mobile Route ☒ General Delivery — Delivery Identifier *(a number identifying a Rural Route, Suburban Service or Mobile Route delivery mode)*

D. Municipality	Postal Station	Province/State	Country	Postal Code
Someplace		ON	Canada	A1B 2C3

E. Telephone Number *(including area code & extension)*	Fax Number *(including area code)*	E-mail Address
123-555-1234	123-555-5678	JSchmidt@ConsultingLtd.com

6. Project Information

Type of Application: ☒ New Certificate of Approval ☐ Amendment to current Certificate of Approval — Current Certificate of Approval Number — Date of Issue *(y/m/d)*

Project Description Summary *(If EBR is applicable, this summary will be used in the EBR posting notice)*

ACME MR is proposing to establish sewage works for the collection, treatment, and disposal of up to 2.47 million cubic metres of process water per year and an estimated 1.75 million cubic metres per year of stormwater runoff to service a service area of 265 hectares. The proposed sewage works will include a Tailings Management Facility, a reclamation system, an effluent water treatment plant and a constructed wetland system, engineering dams and dykes, a stormwater management system, as well as all associated structures and components to support the aforementioned systems. Consulting Ltd. was retained by ACME MR to assist with this application for Certificate of Approval (Industrial sewage works). See attachment 8 for a detailed description of all sewage works.

Project Name *(Project identifier to be used as a reference in correspondence)*	Receiver of Effluent Discharge	Watershed Name
ACME MR Precious Metals Mine Project	Neighbour Lake	Big Nugget Basin

Project Schedule

Estimated date for start of construction/installation	Estimated date for start of operation
September 2010	September 2011

7. Other Approvals / Permits

List all other environmental approvals/permits applied for related to this project or received in relation to this project under the *Environmental Protection Act* (discharges to air, waste management, etc.) and the *Ontario Water Resources Act* (water works).

C of A (Air & Noise)
Permit to Take Water

8. Public Consultation/Notification

Specify all public consultation/notification *(such as public hearings, notification of First Nations, etc.)* related to the project that has been completed or is in the process of being completed.

see Attachment 4 and Attachment 9

9. Environmental Bill of Rights Requirements

Is this a proposal for a Prescribed instrument under EBR?	If "Yes," is it excepted from public participation?	If it is excepted from public participation provide reason:	
☒ Yes ☐ No	☐ Yes ☒ No	☐ Equivalent Public Participation	☐ Environmentally Insignificant Amendment or Revocation
		☐ Emergency	☐ EAA or Tribunal Decision

Documentation is support of the above noted exception must be provided (refer to "Guide")

10. Supporting Information Checklist - *This is a list of all supporting information to this application and is subject to the FOIPPA and EBR*

Supporting Information	Attached		Reference	Can be disclosed	
General					
Pre-application consultation record	☒ Yes	☐ No	Attachment 2	☐ Yes	☒ No
Proof of Legal Name of Client	☐ Yes	☒ No		☐ Yes	☐ No
Copy of NEPDA Permit	☐ Yes	☒ No		☐ Yes	☐ No
Name, Address and Phone Number of the Operating Authority	☒ Yes	☐ No	see page 1, section 2	☐ Yes	☒ No
Name, Address and consent of land/site owner for the installation/construction and operation of the works/facility	☐ Yes	☒ No		☐ Yes	☒ No
Documentation in support of EBR Public Participation Exception	☐ Yes	☒ No		☐ Yes	☐ No
Proof of Public Consultation/Notification	☒ Yes	☐ No	Attachment 4, Attachment 9	☐ Yes	☒ No
Financial Assurance	☐ Yes	☒ No		☐ Yes	☐ No
Technical					
Description of the Industrial Processes (sources of sewage)	☒ Yes	☐ No	Attachment 5	☐ Yes	☒ No
Sewage Quantity and Quality Characteristics	☒ Yes	☐ No	Attachment 5	☐ Yes	☒ No
Detailed Description of the Proposed Works	☒ Yes	☐ No	Attachment 8	☐ Yes	☒ No
Design Brief/Report	☒ Yes	☐ No	Attachment 5	☐ Yes	☒ No
Hydraulic and Process Calculations	☒ Yes	☐ No	Attachment 5	☐ Yes	☒ No
Process Sludge Handling Program	☒ Yes	☐ No	Attachment 5	☐ Yes	☒ No
Process /Effluent Monitoring Program	☒ Yes	☐ No	Attachment 2	☐ Yes	☒ No
Site Plan	☒ Yes	☐ No	Attachment 5	☐ Yes	☒ No
Engineering Drawings and Specifications	☒ Yes	☐ No	Attachment 5	☐ Yes	☒ No
Environmental Impact Analysis (surface water)	☐ Yes	☒ No		☐ Yes	☐ No
Environmental Impact Analysis (ground water)	☐ Yes	☒ No		☐ Yes	☐ No
Environmental Impact Analysis (odour and noise)	☐ Yes	☒ No		☐ Yes	☐ No
Final Effluent Criteria Accepted by Regional Office of the Ministry	☒ Yes	☐ No	Attachment 2	☐ Yes	☒ No
Site and Soil Assessment Report	☐ Yes	☒ No		☐ Yes	☐ No
Stormwater Management Report	☒ Yes	☐ No	Attachment 5	☐ Yes	☒ No
Other Attached Information	☒ Yes	☐ No	Legal Survey	☐ Yes	☒ No

11. Payment Information

Amount Enclosed: $ 14,200 *Please attach completed "Costs for EPA s.53 Applications – Supplement to Application for Approval" (PIBS 4107).*

Method of Payment

☒ Certified Cheque ☐ Money Order ☐ VISA ☐ MasterCard ☐ American Express

Credit Card Information *(if paying by VISA, MasterCard or American Express)**

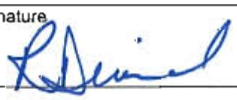
Name on Card *(please print)*	Credit Card Number	Expiry Date (mm/yy)

Cardholder Signature	Date *(y/m/d)*

**NOTE: credit card accepted for payments UNDER $10,000.00 only.*

12. Statement of Client

I, the undersigned hereby declare that, to the best of my knowledge, the information contained herein and the information submitted in support of this application is complete and accurate in every way and that the Project Technical Information Contact identified in section 5 of this form is authorized to act on my behalf for the purpose of obtaining approval under Section 53 of the OWRA for the sewage works identified herein.

Name *(please print)*	Title
Robert Diamond	Project Manager
Signature 	Date *(y/m/d)* 2010/03/13

Ontario

Sample of a Master Business Licence

Date Issued: ⧖✢✲✤ ✈
(yyyy-mm-dd)

Business Name and Mailing Address:

⧖✢✲✤ ✈★✢!!
⌐⌐◘ ⧖★✱✶✧✤✱✤ ➪✳✱✤✤✳
⧖★✱✳✲✶★▬ ✎★✳✲✱✲
✍□✍ ⌐⧖⌐

Business
Address: SAME AS ABOVE

Telephone: ⧖✢✲✤ ✈★✢!! Ext: Fax: ⧖✢✲✤ ✈★✢!!

E-Mail: ⧖✢✲✤ ✈★✢!!

Legal
Name(s): ⧖✢✲✤ ✈★✢!!

Type of
Legal Entity: ⧖✢✲✤ ✈★✢!!

Business Information	Number	Effective Date (yyyy-mm-dd)	Expiry Date (yyyy-mm-dd)
ACME Mineral Rights LLC	123456789	⧖✢✲✤ ✈	⧖✢✲✤ ✈

To the Client: When the Master Business Licence is prestnted to any Ontario business program, you are not required to repeat information contained on this licence. Each Ontario business program is required to accept this licence when presented as part of its registration process. Call the Ontario Business Connects Helpline at 1-800-565-1921 or (416) 314-9151 or TDD (416) 326-8566 if you have any problems.

To the Ontario business program: A client is not required to repeat any information contained in this licecen in any other form used in your registration process.

00/00

000 000/000-00000000000 BATCH 0000

Attachment 1:

Costs for OWRA s. 53 Applications, Supplement to Application for Approval (PIBS 4107e)

Ministry of the Environment | Ministère de l'Environnement

Ontario

Ce formulaire est disponible en français

COSTS FOR OWRA s.53 APPLICATIONS
SUPPLEMENT TO APPLICATION FOR APPROVAL

*This form is to be completed for all applications under the **Ontario Water Resources Act**, s.53 received by the Environmental Assessment & Approvals Branch. Please submit this form with your completed application form. For instructions/assistance completing this form, please refer to publication number 4180 titled: "Guide: Application Costs for Sewage Works, s.53 OWRA". This form and associated publications are available on the Ministry of the Environment web site at www.ene.gov.on.ca or by contacting the Environmental Assessment and Approvals Branch at 1-800-461-6290.*

Company Name:	Application/Certificate of Approval Number (if known)
ACME Mineral Rights LLC (ACME MR)	

Application Cost: ***Indicate the applicable aspect(s) of the application and complete the corresponding section(s) of this form.***

		Total Cost
☐	Administrative amendment of an existing approval (Section 1)	
☐	Fee exempted amendment or revocation of an existing approval (Section 2)	$ 14200
☒	Approval, amendment or revocation requiring technical review (Section 3)	

Section 3

Print Form

SECTION 1: ***Administrative Amendment of an Existing Approval***

Description	Cost	(✓)
Administrative amendments (no technical review involved)	$ 100	☐
TOTAL COST:	$	

SECTION 2: ***Fee Exempted Amendment or Revocation of an Existing Approval***

Description	Cost	(✓)
Administrative revocation (no technical review involved)	$ 0	☐
Any revocation requested as a result of requirements imposed by conditions of an existing approval	$ 0	☐
Any amendment requested as a result of requirements imposed by conditions of an existing approval	$ 0	☐
TOTAL COST:	$	

SECTION 3: ***Complete tables 1, 2 & 3 and enter your information in the summary table below.***

	Description	Cost	(✓)
	Administrative processing	$ 200	✓
Table 1	Wastewater Treatment and Disposal (Table 1)	$ 8000	☒
Table 2	Wastewater Disposal (Table 2)	$	☐
Table 3	Review (Table 3)	$ 6000	☒
	Hearing (if required)	$ 18,000	☐
	TOTAL COST:	$ 14200	

Table 1: Wastewater Treatment and Disposal

When completing this table, please note the following:

Category 1 Amendment:
The application relates to an amendment to an existing treatment plant approval to include additional facilities to increase the approved rated capacity of the plant, including the expansion, re-rating, or upgrading of an existing facility.

Category 2 Amendment:
The application relates to an amendment to an existing treatment plant approval to include additional facilities that do not increase the approved rated capacity of the plant, including new tertiary treatment facilities, plant process waste stream treatment and disposal facilities, new treatment facilities to replace deteriorated facilities and the establishment, alteration, expansion or replacement of an outfall.

Category 3 Amendment:
If the application relates to the alteration, extension or replacement of treatment plant equipment or processes that do not involve the addition of new facilities, including:

A. the alteration, extension or replacement of a pumping system, an aeration system, a chemical storage or application system, filter media or a standby power supply system,
B. the provision of additional points of process chemical application, and
C. the provision of odour control equipment facilities.

Category 4 Amendment:
Any other case of amendment requiring technical review.

Description	Maximum Design Capacity	Application Type	Amendment Category	Cost	(✓)	Ref.
A municipal or private facility for the treatment and disposal of sewage including a lagoon or stabilization pond or a sewage treatment plant	≤ 4,550 m³/day	Approval or Revocation*	N/A	$ 5,000	☐	1.1.1
		Amendment	Category 1	$ 5,000	☐	1.1.2
			Category 2	$ 3,600	☐	1.1.3
			Category 3	$ 1,800	☐	1.1.4
			Category 4	$ 600	☐	1.1.5
	> 4,550 m³/day	Approval or Revocation*	N/A	$ 10,000	☐	1.1.6
		Amendment	Category 1	$ 10,000	☐	1.1.7
			Category 2	$ 3,600	☐	1.1.8
			Category 3	$ 1,800	☐	1.1.9
			Category 4	$ 600	☐	1.1.10
A facility for attenuating stormwater runoff peak flow rate or volume or for managing stormwater runoff quality such as detention or retention ponds, underground chambers, oversized sewers, rooftop storage, parking lot storage, oil, grit and silt separators, flow control outlet structures, infiltration wells, perforated sewers, and trenches or outfalls	N/A	Approval or Revocation*	N/A	$ 2,000	☒	1.2.1
		Amendment	Category 1	$ 2,000	☐	1.2.2
			Category 2			
			Category 3			
			Category 4	$ 600	☐	1.2.3
A facility for the treatment and disposal of leachate	N/A	Approval or Revocation*	N/A	$ 6,000	☐	1.3.1
		Amendment	Category 1	$ 6,000	☐	1.3.2
			Category 2	$ 3,600	☐	1.3.3
			Category 3	$ 1,800	☐	1.3.4
			Category 4	$ 600	☐	1.3.5
A facility for the treatment and disposal of industrial process wastewater, including contact cooling water.	N/A	Approval or Revocation*	N/A	$ 6,000	☒	1.4.1
		Amendment	Category 1	$ 6,000	☐	1.4.2
			Category 2	$ 3,600	☐	1.4.3
			Category 3	$ 1,800	☐	1.4.4
			Category 4	$ 600	☐	1.4.5
				TOTAL COST:	$ 8000	

** revocation requiring technical review*

Back to Application Cost Section

Table 2: ***Wastewater Disposal***

Description	Design Capacity	Application Type	Increase in Design Capacity?	Cost	(✓)	Ref.
A subsurface disposal facility	≤ 15 m³/day	Approval or Revocation*	N/A	$ 600	☐	2.1.1
		Amendment	Yes	$ 600	☐	2.1.2
	> 15 m³/day, ≤ 50 m³/day	Approval or Revocation*	N/A	$ 1,500	☐	2.1.3
		Amendment	Yes	$ 1,500	☐	2.1.4
	> 50 m³/day	Approval or Revocation*	N/A	$ 3,000	☐	2.1.5
		Amendment	Yes	$ 3,000	☐	2.1.6
A facility for the disposal of spent water from a non-contact industrial cooling process.	N/A	Approval or Revocation*	N/A	$ 1,000	☐	2.2.1
		Amendment	Yes	$ 1,000	☐	2.2.2
Storm and sanitary sewers and appurtenances	N/A	Approval or Revocation*	N/A	$ 900	☐	2.3.1
		Amendment	Yes**	$ 900	☐	2.3.2
Storm and sanitary pump stations, force mains, and sanitary sewage detention chambers or oversized sewers.	N/A	Approval or Revocation*	N/A	$ 1,800	☐	2.4.1
		Amendment	Yes	$ 1,800	☐	2.4.2
			TOTAL COST:	$		

** revocation requiring technical review*

*** expansion of existing sewers*

Back to Application Cost Section

Table 3*: Review*

Description	Cost	(✓)
Review of Hydrogeological Assessment	$ 3,000	☐
Review of effluent quality criteria assessment for stormwater management, cooling water or soil remediation facilities	$ 1,400	☐
Review of effluent quality criteria assessment for municipal or private sewage, industrial process wastewater or leachate treatment plant	$ 6,000	☒
TOTAL COST:	$ 6000	

Back to Application Cost Section

Attachment 2:

Summary of Pre-Application Consultation and Letter of Agreement from MOE Regional Office for effluent discharge, effluent limits and monitoring.

SAMPLE CONSULTATION LETTER

Ontario

Ministry of the Environment

June 16, 2009

ACME Mineral Rights LLC
12345 Concession 7
Copious d'Or
North Nugget
C2B 6B2

Mr. Schmidt,

This letter is a follow-up to our meeting at our South Nugget District Office on June 12, 2009. We would like to thank you again for taking the time to consult us on your proposed metals mine site near Copious d'Or.

This summarizes the agreed upon terms for the Site-specific effluent discharge and monitoring:

- The proposed effluent discharge limits, the surface water and ground water monitoring programs, and the effluent discharge locations have been accepted as noted in the Assimilative Capacity Study completed by Consulting Ltd., dated August 2008. The table below summarizes proposed effluent criteria.

Table 1 – Effluent Limits and Objectives		
Effluent Parameter	***Daily Concentration Limits (mg/L)***	***Monthly Concentration Objectives (mg/L)***
Cyanide	0.2	0.005
Total Copper	0.2	0.005
Total Nickel	0.6	0.025
Total Suspended Solids	25	15
Total Ammonia Nitrogen	10	5
pH of the effluent maintained between 6.0 to 9.5, inclusive, at all times		

- A monitoring network will be established and maintained for the duration of the mine operation and as per the approved closure plan.

- The MOE South Nugget Regional Office will be consulted after the completion of the groundwater monitoring network wells and collection of the background sampling data.

SAMPLE CONSULTATION LETTER

Ontario

Ministry of the Environment

The proposed effluent limits and monitoring requirements do not release ACME Mineral Rights LLC to comply with the obligations under O.Reg.560/94 as amended.

Regards,

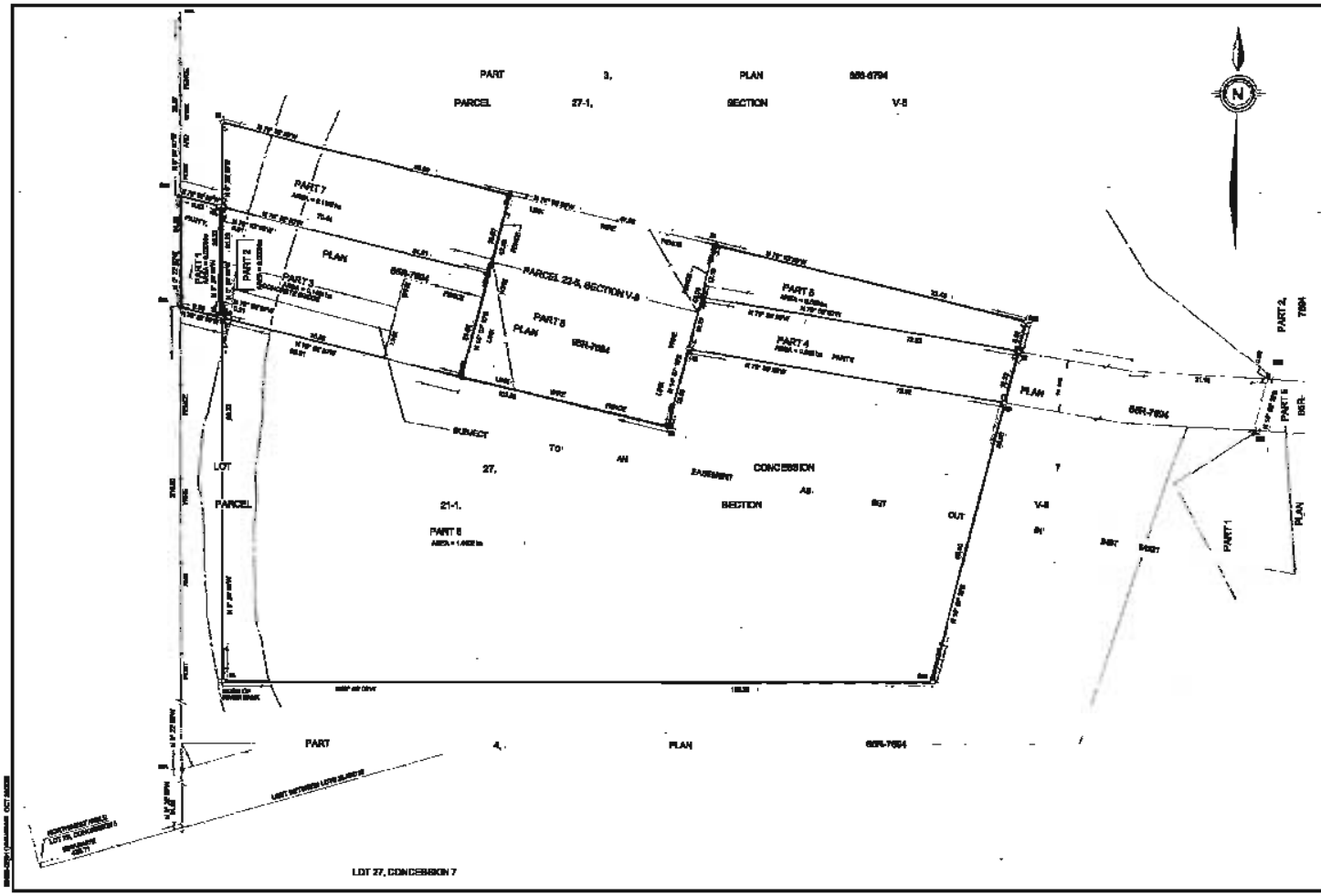
M.O.Earnest

Michael O. Earnest
South Nugget , Director, Regional Office
Ontario Ministry of the Environment

Attachment 3:

Legal Survey

SURVEYOR'S COPY



I REQUIRE THIS PLAN TO BE DEPOSITED UNDER THE LAND TITLES ACT

DATE OCTOBER 9, 1992

J. De Bruyn

ONTARIO LAND SURVEYOR

RECEIVED AND DEPOSITED

DATE October 9, 1992

Land Registrar

LAND REGISTRAR

PARCEL 1 TO 7 (BEING PARTS 1, PART OF PARCEL 21-1, PART OF PARCEL 23-5, SECTION V-8 PARTS 1, 2, 3 AND 4, SUBJECT TO AN EASEMENT AS SET OUT IN INST.

PLAN OF SURVEY OF

PART OF LOT 27, CONCESSION 7 CITY OF COPIOUS D'OR

SCALE 1:500

40m 0 40m

SURVEYORS INC. 1992

METRIC

DISTANCES SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048

LEGEND

- SIB — DENOTES SURVEY MONUMENT PLANTED
- SIB — DENOTES SURVEY MONUMENT FOUND
- SSM — DENOTES STANDARD IRON BAR
- IB — DENOTES IRON BAR
- C — DENOTES JOHN SMITH, O.L.S.
- MNO — DENOTES MINISTRY OF NATURAL RESOURCES
- SIB — DENOTES JAMES SMITH, O.L.S.
- ID — DENOTES I.D. IDENTIFICATION
- WIT — DENOTES WITNESS
- WIT — DENOTES SPLAN SSM - 7694

CAUTION

THIS PLAN IS NOT A PLAN OF SUBDIVISION WITHIN THE MEANING OF THE PLANNING ACT.

SURVEYOR'S CERTIFICATE

I CERTIFY THAT:

1. THIS SURVEY AND PLAN ARE CORRECT AND IN ACCORDANCE WITH THE SURVEYS ACT AND THE LAND TITLES ACT AND THE REGULATIONS MADE THEREUNDER
2. THIS SURVEY WAS COMPLETED ON THE 4 DAY OF OCTOBER, 1992

October 7, 1992

DATE

J. De Bruyn

ONTARIO LAND SURVEYOR

SURVEYORS INC.

DRAWN BY: MP | CHECKED BY: BH | SCALE 1:500 | REFERENCE 13-94-007

Attachment 4:

Proof of Public Consultation

123A Beesee Drive,
Copious d'Or, ON
D0R 0R0

June 5, 2007

Dear Mr. E. Mann,

As part of our ongoing commitment to inform the public of the proposed ACME Mineral Rights LLC (ACME MR) Precious Metals Mine development near Copious d'Or, ACME MR invites you to a public information session on Thursday, July 5, 2007 at 6:30 p.m. The meeting will be held at the Copious d'Or Community Centre, located at 7 Yellow Brick Rd.

The session will include an update on the technical aspects of the project, an update on the current schedule of activities, and discussion on community job opportunities with ACME MR. The session will also provide an opportunity to ask questions to both the ACME MR project team and MOE representatives from the South Nugget District Office.

In addition, ACME MR will be holding an open house at the proposed mine site in the coming months. The open house will consist of a BBQ and an off-road dump truck, similar to those that will be used at the site, will be available for viewing. Details on the open house will be presented at the meeting and invitations will mailed out later this month. As always, you are welcome to attend both the meeting and open house.

These sessions are part of our community outreach efforts to keep you and others in the community informed about the project.

We look forward to seeing you at the information session and open house.

Sincerely,

JSchmidt

John Schmidt

SUMMARY OF STAKEHOLDER CONSULTATION

Informal public consultation has been ongoing since the planning stages of the Project. Informal public meetings were held in August 2005 (40 attendees) and June 2006 (25 attendees) in Copious d'Or, a town in close proximity to the Precious Metals Mine Site. Information on the Project location, Project schedule, geology, environmental baseline studies, and other information specific to the Project were provided. ACME Mineral Rights LLC (ACME MR) solicited input from the attendees on the information presented, which was considered in the planning of subsequent Site activities and the mine design.

Consultation with Aboriginal Groups has also been ongoing since the planning stages of the Project. During a formal information session held with Aboriginal Groups in September 2005, ACME MR agreed to form a steering committee between ACME MR, Copius d'Or, North Nugget County, and the Aboriginal Groups. It was decided that the steering committee would be informed of all Project expansions, temporary suspension of extraction or other operations, and any amendments to Certificates of Approval for the Site.

A formal Public Information Session was held on July 5, 2007 from 6:30 PM to 10:00 PM at the Copious d'Or Community Centre, located at 7 Yellow Brick Rd. The purpose of the meeting was to provide the community with an update on the technical aspects of the Project, an update on the current schedule of activities, and to communicate community job opportunities with ACME MR. The session also provided an opportunity for the public to ask questions to both the ACME MR Project Team and the Ontario Ministry of Environment (MOE) Representatives from the South Nugget District Office. Consulting Ltd., which is acting in a permitting management role for ACME MR, determined that one formal meeting within the town of Copious d'Or would meet MOE requirements.

Notices were posted at local businesses and public locations including Uncle Harry's Kitchen and the North Nugget General Store in Copious d'Or, and the Big River Service Station, the Mount Ore Fire Hall, and Sir John MacDonald Public School in Mount Ore. Approximately 50 individuals and families known to have an interest in the Project, including present and former residents of Copious d'Or, were notified of the Public Information Session by phone or in person. In advance of the Session, a notice was also published in the North Nugget Observer and invitations were mailed to residents living in the immediate vicinity of the Site. Local municipal officials were also made aware of the Public Information Session, as was the MOE.

A series of panels were available for viewing, which explained the following:

TABLE 1: SUMMARY OF PRESENTATION POSTERS

Poster Name	Poster Description
Welcome	Outline of the textual and illustrated presentation.
Summary	Thumbnail of site history, the Project, the proponent and the time frame.
Who is ACME MR?	Introduction to the company, its resources and its directors and management.
Who owns Precious Metals Mine?	Outline of ownership of the mineral rights.
Geology	Explanation of the geology at the Precious Metals Mine Site.
Resource Estimate	Explanation of the drilling, geological interpretation and resource calculation process leading to the estimation of the size of the gold resource.
Schedule of Activities	A time-line of past and future activities leading to eventual gold production.
Feasibility Study	Description of the various elements of the Feasibility Study, either completed or pending.
Permitting	Outline of the government approvals required to undertake mining and ore processing operations.
Mining	Explanation of how mining of the ore and waste rock within the pit would be conducted, and how mining was conducted in the past.
Ore Processing	Description of the ore processing methodology, with flowsheet, from crushing and grinding through the chemical process to the pouring of gold bars.
Waste Rock Management	The plan for the storage of waste rock and the treatment and safe storage of tailings, with site layout map.
Site Water Management	Summary of the water usage requirements, with water sourcing, re-cycling, circulation and safe discharge noted.
Reclamation	Outline of the process to return the site, during and after mining, to a state at least equal to that prior to disturbance.
Personnel	A schedule of the number and type of jobs expected during construction and the life of the mine.

Representatives of potential suppliers and consultants to the Project were present at the Session to provide additional information supplement to the information panels. Supplemental information was provided on blasting activities, cyanide use, storage and disposal, tailings dam design and operation, and archaeology and cultural resource management. Drill cores from the Precious Metals Mine Site were also displayed, as were several historic photos of the Site.

Participants were asked to sign in to the Session and were provided with a quick overview of the panels and agenda. A summary of the total number of attendees and their home community is provided below. The remainder of the Session was structured

to allow attendees to freely view the various information panels and provide comment and questions to company representatives, suppliers, and consultants. ACME MR representatives and the aforementioned suppliers and consultants were also available to assist attendees with any questions or to provide additional information upon request. Comments from the participants were recorded on flipcharts for the other attendees to view. This format allowed for all participants to get a sense of the primary issues/concerns and also allowed ACME MR to use the information to refine aspects of the Project. A summary of the comments is provided below.

A total of 54 participants attended the session with a breakdown of their home communities shown in Table 2.

TABLE 2: COMMUNITIES OF PUBLIC INFORMATION SESSION PARTICIPANTS

Location	Number of Participants
Big River	7
Little Rock	12
Mount Ore	8
Copious d'Or	21
Glowfield	6
Total	**54**

The participants represented good local and regional coverage and also discussed a number of items that they felt were important in the consideration of the design and planning of the Project. As previously noted, a record was kept and the results are summarized below.

ISSUES AND CONCERNS

Table 3 lists the issues and concerns raised by area residents at the Public Information Session.

TABLE 3: SUMMARY OF COMMENTS AND CONCERNS RAISED BY STAKEHOLDERS

Question/Issue	Response
When is the start-up date for activities at the mine?	Answer given was early 2010 with favourable permitting. This question was raised by 18 of the participants.
What will be done with the current Big River Museum?	Answer given was that ACME MR's mining plan does not need the Museum to be moved but ACME MR is in discussions with the local heritage group and community to determine the possibility of enhancing the role of the Museum locally. This question was raised by 9 of the participants.
What is the plan for reclaiming the site when mining is finished?	Answer given was that all disturbed areas will be shaped to promote water retention and seeded with appropriate vegetation mixes. Existing natural vegetation will be promoted and used where possible through replanting and the re-use of stockpiled organics. The pit area will be flooded to form a lake with revegetated sides and re-shaped edges in key areas to allow for potential public access and egress as well as nearshore vegetation growth. This issue was raised by 7 of the participants.
What is the realignment plan for Neighbour Lake Road and the west Big River access road? Will the realignment plans allow for 24-hour access?	Answer given was that a realignment of Neighbour Lake Road is planned with an equal or better road than at present. The realignment will be north of the current path and will not require a stop to access Big River Road, as is the case now. All other access roads to forestry and recreational lands to the west and south of the Site will be realigned but will be maintained with equal or better access on a 24-hour a day basis subject to blasting schedules. This issue was raised by 6 of the participants.
Is the tailing management area designed for long-term protection of the local environment, particularly after mine operations end?	Answer given was that the tailings management must be able to create water discharges that meet all provincial and federal regulation. ACME MR will design a facility that provides long term protection of the local environment during and after conclusion of the mining and processing operations. This issue was raised by 5 of the participants.
Will there be vegetation and visual buffers around the tailings management areas and other disturbed areas such as stockpiles?	Answer given was vegetation will remain in all areas of the mine development, unless required to be removed as follows: certain areas around the tailings management facility may require vegetation to be removed so as not to have trees, rock and soils slump into the tailings management area. All attempts will be made to leave vegetated buffers in place to assist with erosion control, visual effects and surface water quality. This issue was raised by 3 of the participants.

Attachment 5:

Design Brief (Attached separately)

DESIGN BRIEF

PRECIOUS METALS MINE

Copious d'Or, Ontario

Prepared for:
ACME Mineral Rights LLC
123 Easy St.
Copious d'Or, Ontario
C3B 2A1

Prepared by:
Consulting Ltd.
123 Office Drive
Someplace, Ontario
A1B 2C3

March 15, 2010

CONSULTING LTD.

TABLE OF CONTENTS

TABLE OF CONTENTS

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

1.0 INTRODUCTION

This design brief is submitted on behalf of ACME Mineral Rights LLC (ACME MR) to the Ontario Ministry of the Environment (MOE) in support of a Certificate of Approval (C of A) application for Industrial Sewage Works for the Proposed ACME MR Precious Metals Mine (Mine) to be located near the town of Copious d'Or in North Nugget County (Site). Figure 1.1 presents the regional setting of the Site. Figure 1.2 presents the Site location. Figure 1.3 presents the Site plan.

A Mine Closure Plan outlining Mine rehabilitation and financial assurance was prepared and filed with the Ministry of Northern Development, Mines and Forestry (MNDMF). A Copy of this document may be obtained directly from the MNDMF.

This design brief presents details of the final design of the sewage works for the ACME MR Mine, including:

- description of the proposed project and associated sewage works
- detailed description of the stormwater management (SWM) works
- summary of the proposed effluent quality criteria
- detailed description of all proposed treatment units and identification of process design parameters
- detailed process design and sizing calculations for all major processes
- hydraulic calculations for all process streams within sewage works
- overview of contingency planning measures for the proposed facilities in the event of spills and/or berm/dyke failure

2.0 PROJECT DESCRIPTION

2.1 General

The proposed ACME MR Precious Metals Mine will be located near the town of Copious d'Or in North Nugget County, Ontario. Figure 1.1 presents the regional setting of the Site. Figure 1.2 presents the Site location. The project facilities consist of an Open Pit mine, a Processing Plant, a waste rock stockpile (WRSP), and a Tailings Management Facility (TMF).

2.2 Mining

2.2.1 Open Pit Description

The Open Pit will be 450 metres (m) wide, approximately 800 m in length, and is anticipated to be 120 m deep at its maximum extent. The final Open Pit slopes will be 27 degrees (º) in the first 5 m of overburden and 45-47º in the underlying bedrock. The Open Pit will be accessed via a 22 m wide, 10% haulage ramp in the east and south walls. The overall Open Pit slope will be reduced to about 40º where the ramp intersects the pit walls.

2.2.2 Operations

Mining will be conducted as a conventional drill-blast, load-haul, Open Pit operation. Blast patterns will be drilled 4 m by 4 m, loaded with bulk Ammonium Nitrate–Fuel Oil (ANFO) explosive, and initiated using non-electric means. Excavation will be performed in 5 m benches using hydraulic excavators. Ore will be hauled by truck to the run-of-mine (ROM) pad for direct dumping to the crusher, while waste will be sent to the WRSP for storage.

2.2.3 Production Schedule

The Open Pit will have a contained volume of material of approximately 13.9 million m^3. Of this, 1.3 million m^3 will be overburden, 2.7 million m^3 will be ore, and the remaining 9.8 million m^3 will be waste rock. Mining will be conducted for six years; one year of pre-production during construction and five years during processing. The nominal mining rate is 20,000 tonnes per day (tpd).

2.2.4 Stockpiling

During the life of the mine, 830,000 tonnes of ore will be stockpiled at the WRSP and rehandled for processing in the latter years of the Mine life. Stockpiling ore in early years permits uninterrupted mill feed at the end of the Mine life when the Open Pit bottom becomes physically small and mining rates are reduced.

A small (100,000 tonne) stockpile will be maintained at the ROM Pad throughout the Mine life to facilitate blending and sorting of material prior to processing. All material mined as ore is planned for milling. Any ore remaining in stockpiles at the end of the Mine life will be rehandled back into the Open Pit.

2.3 Processing

2.3.1 Mill Operation

Processing will be conducted at a rate of 4,500 tpd. The process involves size reduction by conventional crushing and grinding to liberate coarse gold mechanically and extraction of fine gold by cyanidation. Metallurgical recovery is expected to be 93%, on average. The Processing Plant will operate on a continuous basis 333 days per year for an expected Mine processing life of 5.1 years.

2.3.2 Process Description

Ore mined from the Open Pit will be dumped directly into a crusher dump pocket at the ROM Pad. A portable, 3-stage crushing circuit (i.e. processes and associated equipment) will reduce feed from P80 600 millimetre (mm) to P80 9 mm in preparation for grinding. A 2250 horse power (HP) ball mill will further reduce the crushed ore to P80 150 microns (µm).

The ball mill discharge will be classified using hydro-cyclones. Approximately 30% of the ball mill discharge will be directed to the gravity circuit where a centrifugal concentrator achieves approximately 50% of total recovery. Coarse gold recovered in the gravity circuit will be subjected to high-intensity cyanidation (HIC) in preparation for electro-winning (EW) in a dedicated EW cell. Fine gold will be sent to a high-rate thickener, where the slurry density will be increased from 35% to 50% prior to cyanide (CN) leaching.

Carbon-in-leach (CIL) technology will be used to dissolve the fine gold in the thickened slurry with dilute cyanide solution. The dissolved gold will then be adsorbed onto the surface of activated carbon, which will be introduced into the last tank in the CIL circuit. Carbon will be pumped counter-current through the leach circuit, collecting more and more gold as it moves toward the first tank. The fully loaded carbon will be removed from the first tank, screened, and transferred to the elution circuit.

In the elution circuit, a dilute cyanide solution (2.5%) under heat and pressure will be used to strip the collected gold off the carbon. The pregnant eluate will be circulated through an EW cell during each strip, which will deposit the metallic gold as a dirty sludge on steel wool cathodes. The sludge from both the elution circuit and HIC cells will be dried and smelted in a gold furnace.

Barren carbon from the elution circuit will be regenerated in a kiln to ensure its activity before being returned to the tail end of the CIL circuit. Barren slurry exiting the CIL circuit will be subjected to an

SO_2-Air cyanide destruction (cyanide detoxification) process to destroy 99.5% of the cyanide before transfer by pipeline to the TMF. A process flow diagram of the ore processing is presented on Figure 2.1.

2.4 Water Management

2.4.1 Surface Water Management

Surface water management was designed for the Open Pit area, the Processing Plant area, the TMF, and the overall project area. The handling of surface water is discussed in further detail in the following sections. The overall water balance is discussed in Section 3.1.

2.4.1.1 Dewatering Sewage From Open Pit

There will be two major sources of inflows into the Open Pit area; runoff from the Open Pit and surrounding contributing drainage area, and seepage. A ring drain will be established at the base of the overburden in bedrock, which will direct runoff and near-surface flows into the Open Pit sumps.

Runoff and seepage will be collected in the in-pit sumps and pumped by pipeline to the TMF for treatment and discharge or reuse. Sumps will be relocated within the Open Pit as required, depending on the state of development. A detailed stormwater management plan is presented in Appendix A.

Groundwater in the Open Pit area is mildly alkaline due to the carbonate minerals in the surrounding rocks. Static and kinetic testing of waste rock and ore show this material has little propensity for acid generation or dissolution of potential contaminants. In natural waters, the dominant species are trivalent arsenite, As (III), and pentavalent arsenate, As (V). Arsenic is ubiquitous in igneous, metamorphic, and sedimentary rocks and may be concentrated in sulphide mineral deposits. Arsenopyrite is the prevalent arsenic-sulphide mineral at the Site.

A Permit to Take Water (PTTW) application dated June 5, 2009 is currently under MOE review for ACME MR to withdraw approximately 4,500 m^3/day from Middle Lake during the period from October through March of the first year of operation for use in initial ore processing until the tailings pond contains sufficient water for that purpose. The permit application includes information on Open Pit dewatering for up to 7,000 m^3/day to the TMF.

2.4.1.2 Stormwater Management in the Open Pit Area

The Open Pit will be located in a local topographic high resulting in minimal surface water flow directly into the pit. A berm constructed at the surface perimeter will prevent surface runoff from any minor contributing drainage areas from entering the Open Pit. All diverted runoff will be safely directed to existing surface watercourses. All waters entering the Open Pit area will be handled as previously described.

2.4.1.3 Stormwater Management at the WRSP

The WRSP will be surrounded by a runoff collection ditch, sized to manage runoff from the 1/200 year storm event, and will be drained by two culverts running under the public road, permitting water to flow into the TMF. All runoff from the WRSP will be directed to the TMF. The annual development of the WRSP is shown in the detailed drawings attached separately.

2.4.1.4 Tailings Management Facility

The TMF will be composed of a series of dams used to store tailings solids, reclaim water for use in processing, and treat excess water prior to discharge. The following facilities comprise the TMF:

- Tailings Pond
- Water Reclaim Pond
- Settling Pond
- Holding Pond
- Effluent Treatment Plant (ETP)
- Containment Cells
- Constructed Wetland (CW)

The Tailings Pond will be the primary area used to store the tailings. It will be a shallow basin formed by clay-core, rock fill embankments on three sides and a permeable, rock fill divider dyke which will separate it from the Water Reclaim Pond. The tailings will be discharged by pipeline into the impoundment where they flow across the basin floor and settle. The following is a list of the major inflows to the TMF:

- Runoff from the tailings management area
- Runoff and seepage from the Open Pit
- Runoff from the WRSP
- Discharges from the Processing Plant

A detailed listing of all flows and anticipated water quality characterization is presented in Appendix L. A detailed description of the water handling structures within the TMF is presented in Section 3.2.

The Water Reclaim Pond is a subdivision of the Tailings Pond. It will be a triangular shaped area bounded on two sides by the clay-core, rock fill dams of the Tailings Pond and separated from the tailings solids by the rock fill Divider Dyke. As the tailings settle in the Tailings Pond, the associated free water will decant into the Water Reclaim Pond where it will be reclaimed for either processing or treatment and discharge.

The ETP will treat excess water to remove arsenic and soluble metals prior to discharge, this is described in detail in Section 3.0.

The Containment Cells will be clay-lined, rock fill structures used to store the waste from the ETP discharge and material contaminated by historic mining activity. These cells are described in detail in Section 3.0.

The Settling Pond and Holding Pond are subdivisions of the area known collectively as the Polishing Ponds. The Polishing Ponds will be formed by a clay-core, rock fill dam that abuts the main Tailings Pond dam. Effluent discharged from the ETP will be retained in the Settling Pond for 7 to 14 days to allow contaminants to precipitate and settle to the bottom of the pond.

Supernatant in the Settling Pond will decant over the rock fill divider dyke, which separates it from the Holding Pond. Water will be retained in the Holding Pond for a further 7 to 14 days until adequate quality for discharge is established or it will be reclaimed for special "treated water" applications in the mill.

Water from the Holding Pond will be discharged to the CW. The CW will be a series of shallow ponds where natural biochemical processes will be used to purify treated water discharged from the Holding Pond prior to release into a natural wetland buffer area and Neighbour Lake. The CW is described in detail in Section 3.0.

The detailed design of the Tailings, Water Reclaim, Settling, and Holding Ponds is provided in Appendix B. These facilities and their associated infrastructure are described in detail in Section 3.0.

2.4.2 Groundwater Management

The Site hydrogeology consists of a fractured rock aquifer system that is overlain by a thin aquifer in the till. The degree of hydraulic connection amongst the smaller bedrock fracture systems is poor to moderate, and the main zones that are capable of storing and transmitting relatively large amounts of groundwater are the larger scale faults. The water table is close to the surface across the Mine Site reflecting flat lying terrain, low permeability bedrock and the excess of annual rainfall over evaporation. Thus, the bedrock sequence and part of the overlying tills will be saturated with groundwater under ambient conditions.

A series of geotechnical/hydrogeological drillholes were sampled for groundwater quality in 2006 at the Site in the Open Pit footprint (see the Geotechnical Analysis Report in Appendix N for locations). The holes were purged using an airlift method and then sampled after fully developing and purging the well to obtain a representative groundwater sample. The water obtained from the drillholes represents groundwater from bedrock at the Site. Groundwater samples from the six locations were analyzed for general chemistry and metals. Results (included in Appendix N) indicate that groundwater is slightly basic (pH from 7.02 to 8.08) with elevated hardness (45-160 mg/L) and possible road salt impacts at one

of the locations. Certain metals such as aluminum, arsenic, manganese, strontium and zinc are elevated relative to guidelines for drinking water in Canada, but within ranges found in groundwater in Ontario.

The actual volume of groundwater stored in the bedrock aquifer is small, reflecting the relatively small primary porosity of these rocks. Some of the larger bedrock structures may be hydraulically connected to surface water bodies, which may become sources of aquifer recharge under a mine de-watering scenario. An ongoing testing program is expected to confirm earlier investigations that indicated that the future mine operation will not negatively affect the flow in the White River.

Hydrogeological studies indicate that as the Open Pit advances, relatively minor de-watering will be required. Eight vertical monitoring 5½ inch diameter bores were drilled in December 2005 specifically, and successfully, targeting potential structural aquifers to depths beneath the optimized pit to evaluate the groundwater flow in the bedrock. Average depth of these bores was 108 m and the maximum depth 154 m. Air lift tests were conducted for up to 30 minutes at the completion of each hole. Water flows were negligible (0 to 0.5 litres per second (L/sec)) in seven of the holes with a maximum of 5 L/s registered from the overburden in the eighth hole. With such modest groundwater flows in the bedrock no boreholes were converted to trial production wells and no pump tests were conducted. Since no substantial bedrock groundwater flows were encountered within the Open Pit shell, de-watering of groundwater from the Open Pit will likely commence by pumping from sumps. Groundwater data is provided in Appendix N.

Given the relatively shallow overburden (0 to 5 m) and the observation that only one bore hole of eight encountered any water in the overburden, groundwater flow in the till is expected to be minimal. Nevertheless, three 3 m deep trial pits were excavated during June 2006 at the western end of the proposed Open Pit to evaluate groundwater flow in the till between the Open Pit and White River, a minimum distance of 75 m, and to obtain a generalized estimate of expected inflow rates from the till into the Open Pit. With an estimated hydraulic conductivity of 1m/day and an Open Pit perimeter of 1800 m the expected daily inflow of 450 kL can be managed with a ring drain and several sumps.

The main conclusion from the pit testing program is that the expected rates of groundwater seepage from the till into the Open Pit will be small. The rates of groundwater seepage into the Open Pit are expected to be in the range of 100 kL/day (1.2 L/sec) to 1,000 kL/day (12 L/sec). Under ambient conditions only small variations in the amounts of water exchanged between White River and the nearby shallow groundwater system can be expected. Groundwater yields from boreholes into the bedrock at the Mine Site are likely to be much less than 1 L/sec.

Additional assessment work was completed, to determine the potential linkage between the White River surface water system and the local groundwater regime. This assessment took the form of a temperature survey of the surface water to determine possible areas of upwelling groundwater. The survey was completed in late summer/early fall (September 19, 2006) when shallow groundwater is typically in the 10 to 12 °C range and surface waters are in the 15 to 20 °C range. Dissolved oxygen (DO) readings were

also taken at the sample intervals. The survey was completed from the bridge crossing the White River road, north of the Site to south of the bridge crossing the White River south of the Site, which is a distance of approximately 1.25 kilometres. Readings were taken in areas where the river bottom has hollows, which would have greater potential for groundwater upwelling. The collected data is summarized in Appendix N and indicates temperatures from 16.9 to 19.6 °C and DO from 8.51 to 9.63 mg/L , no correlation was found between the two in this assessment.

This assessment suggests that groundwater upwelling is not occurring through the portion of the White River that lies adjacent to the proposed Open Pit. This further indicates that the surface mine operation will not negatively affect flow in White River.

Potential groundwater inflows from the glacial till above the bedrock were investigated by digging test pits at four sites to the till/bedrock contact, and conducting pumping tests from these pits.

Potential effects on watercourses in the area may include:

- Increased erosion and sedimentation resulting from the construction and operation of the Mine
- Potential changes to White River flow regimes associated with the Open Pit construction
- Potential groundwater contamination from the TMF

The WRSP will also be progressively revegetated to enhance soil stability and minimize sediment transport. Additional specific environmental mitigation plans will include:

- Erosion and Sedimentation Plan-Construction, Operation and Decommissioning
- Environmental Protection Plan (EPP) prior to construction
- Hazardous Materials Management Plan
- Emergency Response Plan
- Environmental Effects Monitoring Plan

A groundwater connectivity evaluation between the proposed Open Pit and White River has shown that White River is well protected by the geology and there will be no anticipated risk of dewatering White River into the Open Pit. A monitoring program has been designed to confirm the results of the various hydrologic and hydrogeologic baseline studies relative to the lack of interaction between groundwater and surface water.

The potential for groundwater contamination from the TMF is low. The groundwater table in the area is near the surface, which will inhibit inflow by maintaining a low flow gradient. In addition, the permeability of the tailings is low and a perimeter cut-off will be included in the design. This cut-off will be part of the low permeability zone within the perimeter dam that will be tied into the underlying low permeability clay or solid bedrock. Seepage through the tailings dam wall is expected to be low. The clay core of the dam will exhibit permeability in the 1×10^{-6} m^3/s range, which will minimize the passage

of tailings water through the dam wall. Tailings deposited along the inside of the dam wall will further reduce seepage. Any seepage that does occur will be captured in collection ditches and pumped back into the pond. For this reason, the impact of seepage on the groundwater quality is expected to be negligible.

In summary, significant adverse project-related effects on the groundwater resources from the Mine are not likely to occur.

2.4.3 Management at Closure

This section provides a brief summary of provisions for management of the Mine at Closure. The general reclamation concept for the project Site is to remove all buildings and facilities that can be dismantled. All non-movable physical aspects including the Open Pit, the Processing Plant Site, the WRSP, and the TMF will be contoured to blend with the natural landscape and re-vegetated. Full details of the Mine reclamation are provided in the Mine Closure Plan that has been filed and cleared with the MNDMF.

The Open Pit will be allowed to flood creating a lake with a shallow water wetland border and a viable aquatic habitat. The flooded Open Pit will reach equilibrium with the surrounding aquifer system, below the Open Pit capacity and will not cause flooding. The flooded Open Pit will create 3 hectares (ha) of shoreline shallow water wetlands and will sustain an additional 9 ha of created wetland to the south. The Mine Closure Plan addresses the monitoring requirements for the Open Pit after Mine closure. The Reclaim Water and Tailings pipelines may be relocated to help direct excess flow from Big River into the Open Pit to reduce the pit filling time. The TMF will be drained and the Polishing Ponds will be turned into a shallow water wetland once treatment of water running through the facility is no longer required. The CW will remain, providing a natural system to purify Site runoff long beyond the end of the mining phase.

The WRSP will be constructed in four lifts, each 10 m in height. The stockpile will be progressively reclaimed during the Mine operation, as construction of the next lift gets underway, the preceding lift will be re-sloped, capped with 30 cm of overburden, 25 cm of topsoil, and hydro-seeded. At closure, the flat forming the top lift of the stockpile will be similarly capped and seeded.

Runoff from the WRSP will continue to be directed to the TMF at closure to ensure that treatment occurs, if required, prior to discharge. Water in the form of precipitation, or snow melt occurring within the TMA, will also flow to the Polishing Ponds for treatment. As the TMA is drained upon closure, the seepage collection ditches will serve to collect runoff outside the TMF and direct it away from the facility.

During the last year of operation, the TMA will be drained and the tailings beach will be covered with waste rock to a depth of 2.0 m in the middle, tapering to 0.1 m at the dam wall. The waste rock will provide a base sloping at 0.5% upon which 30 cm of clay overburden will be spread. A topsoil and vegetative cover will be placed over the clay layer. Ditches will be established along the inside of the

west and east dams of the TMA which will conduct water through the TMA to the spillway leading to the Polishing Ponds.

When treatment ceases (when effluent discharge quality returns to that which existed prior to Mine development, as described in the Mine Closure Plan), the ETP will be removed along with the reclaim pump station, the TMF substation and powerline. The dams will be re-sloped, covered with overburden, topsoil, and seeded. The pond will be drained and sediment cleaned out. Solids will be deposited in the last containment cell for storage. The pond will be allowed to refill to a lower water level consistent with the height of the re-sloped dams. This will increase the amount of shallow water/shoreline habitat offered by the pond. Excess water will continue to flow through the spillway and cascade aerator to the constructed wetland.

Removal of facilities and remediation of disturbed areas will take approximately two years. During this time, all areas will be re-vegetated (natural and/or enhanced) and treatment of on-Site groundwater and surface water is no longer expected to be required. Reforestation will be underway in all areas within five years after closure. Monitoring of Site conditions will be undertaken on a quarterly and annual basis for a period of up to ten years with maintenance and remedial action taking place on an as required basis to ensure that the results of the reclamation are sustainable.

Flooding of the Open Pit will effectively prevent oxidation of any exposed sulphide material in the pit walls. Open Pit water quality is expected to trend towards that presently existing in the "mini-pit" which was the exploratory test pit excavated on the Site eighteen years ago. Water in the "mini-pit" is mildly alkaline with pH ranging from 6.5-8.0 depending on the season.

All man-made slopes on the project Site will be reduced to 3:1 (H:V) or less as detailed in the subsequent descriptions for specific areas of the project Site. Re-sloping is intended (1) to create contours in the disturbed areas that blend into the surrounding terrain and (2) to flatten the landscape as much as possible to prevent erosion. Drawings depicting the multiple stages of the closure conditions and detailed descriptions of the reclamation are presented in the Mine Closure Plan that has been filed with MNDMF.

2.5 Waste Management Facilities

2.5.1 Waste Rock Stockpile (WRSP)

Material within the Open Pit containing insufficient gold to justify processing will be mined and stored in the WRSP. The WRSP will be located approximately 1 kilometre (km) east of the Open Pit, directly adjacent to and north of the TMF. The WRSP will be located in this area to avoid affecting the fish habitat near the Open Pit and to permit runoff from the stockpile to flow into the TMF.

The WRSP covers an area of 50 ha and will be 40 m in height at its maximum extent and has a design volume of 8.6 million m^3. The stockpile will contain three material types including overburden, waste

rock, and ore and the material will be segregated by type to ensure stability and facilitate reclaim. A material balance for the WRSP is shown in Table 1.

The WRSP will be constructed in 10 m lifts. Loaded haul trucks will end dump the material over a safety berm that is approximately half the height of the truck tire. The stockpile will be maintained at all times by a tracked dozer. The working slope angle for the stockpile is 37° (approximately 1.5H:1V). At the completion of each lift, the slope angle of stockpile will be flattened to 20° (approximately 3H:1V) and the waste rock will be covered with overburden, topsoil, and re-seeded.

Table 1 Mine Material Balance (bcm x 1000)

Year	PP	1	2	3	4	5	C1	C2	Total
Mining									
Ore	193	414	560	615	521	411			2714
OB	1300								1300
RX	1380	2080	1940	1880	1430	1120			9830
TMF									
OB	270	22	21	21	21		306		355
RX	855	150	125	100	64				1294
Reclamation									
OB		27	24	11	10	9	9	76	81
RX						390	300		390
Construction									
OB	50								50
RX	360								360
WRSP									
Ore SP	193	71	96	175	161	36	0	0	
OB	980	931	886	854	823	814	499	423	
RX	165	2095	3910	5690	7056	7786	7486	7410	
Total	1338	3097	4892	6719	8040	8636	7985	7833	

	Direct Dump	OB	Overburden
	Rehandle from WRSP	RX	Waste Rock

2.5.2 Waste Rock Management Under Closure Conditions

Metal leaching (ML) and acid rock drainage (ARD) testing were carried out on the waste rock lithologies for the development of the Mine Closure Plan, in accordance with the requirements of Mine Closure Plans and the Mine Rehabilitation Code of Ontario (Schedule 1 to O.Reg. 240/00 – Mine Development and Closure under Part VII of the Mining Act). ML and ARD testing shows that the waste rock has little propensity for acid generation or dissolution of potential contaminants. ML and ARD testing data and waste rock characteristics are documented at length in the Mine Closure Plan that has been filed and cleared with the MNDMF.

2.6 Site Development

Specifications and detailed plans illustrating all aspects of the project development including the Open Pit, the Processing Plant Site, the WRSP, and the TMF are attached separately. Plans show the proposed annual project development during the Mine operating life from 2011-2016. A project schedule is provided in Table 2.

In addition to the operating period, three drawings are provided to illustrate the changes in the Site during decommissioning. These plans represent 2017 (Year 1 of decommissioning), 2019 (Year 3 of decommissioning), and 2021 (Year 5 of decommissioning). These drawings are attached separately.

The Erosion and Sediment Control Plan (presented in Appendix C) shows the Site at five stages of construction. Each stage represents a 3-month period. Areas of activity are highlighted and structures for the management and control of sediment and erosion are indicated.

2.6.1 Open Pit

Mining will be conducted at the proposed full mining rate during the construction period. The Open Pit will be cleared and stripped to its maximum limits during the first year to allow the establishment of the barrier berm and ring drain that will serve throughout the Mine life. In each of the subsequent years of operation, the operating level in the Open Pit, will drop, on average, five benches (25 m). After closure, the most noticeable change will be the progressive flooding of the Open Pit, which will occur over a period of five years.

2.6.2 Processing Plant Site

The Processing Plant and associated infrastructure will be constructed in 2011 and will not change throughout the life of the Mine. This infrastructure includes roads, pipeline, power lines, fences, and other facilities outside of the footprint for the Open Pit, the WRSP, and the TMF. The mill and all other infrastructure except for the ETP will be removed in the first year of decommissioning. It should be noted that at 4,500 tpd, milling would conclude in the third week of 2015, however, as reclamation will be the primary activity that year, 2015 is considered to be the first year of decommissioning.

2.6.3 Waste Rock Stockpile

The WRSP footprint will be small during construction because most of the waste rock and some of the overburden will be used for construction. The footprint will expand in 2010 and will be fully developed in 2011. About 80% of a lift will be completed each year from 2010-2014. It should be noted that in the period from 2014-2017, the volume stored in the WRSP will decrease. This is a result of the rehandling of stockpiled ore to the mill during the last year of operations and recovering overburden and waste rock to reclaim other areas of the Site, principally the TMF.

2.6.4 Tailings Management Facility

The largest feature on the Site is the TMF and the adjacent CW. The TMF will be constructed in 2011 using waste rock and overburden generated by mining. The plan for 2013 shows the Tailings Pond empty (brown), and the Water Reclaim and Polishing Ponds full (blue). This is because Site runoff will be accumulated during construction to enable start-up of the Processing Plant without withdrawing water from surrounding lakes or streams.

The Tailings dam crest for the initial "starter" dam will be 122 m above sea level (ASL). The dam will be progressively raised each year to keep the crest nominally 2 m above the level of the water in the Tailings Pond. Table 7 in Section 3.4.5 shows the relative elevations of the dam crest and pond level. In general, the Tailings Pond level will rise 1 m for each year of processing to finish at an elevation of about 124 m ASL.

At the conclusion of processing, the Tailings Pond will be drained, the tailings capped, and the facility re-vegetated. This process will be delayed in the Polishing Ponds until treatment of Site drainage is complete. Unlike the Tailings Pond, the Polishing Ponds and CW will be developed to the full extent during construction and will remain as such through most of decommissioning.

Table 2 Project Schedule

Year	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Activity	PP	1	2	3	4	5	C1	C2	C3	C4	C5	C6	C7	C8	C9
Construction															
Mining															
Processing															
Decommissioning															
Reclamation															
Monitoring															

PP Pre-production 1 Operations C1 Closure As required

3.0 TAILINGS MANAGEMENT FACILITY

3.1 Overview of Liquid Effluents

All water on the Site will be directed to the TMF. This includes seepage from the Open Pit, runoff from the Processing Plant Site and the WRSP, and effluent associated with the waste products from the processing of the ore. Mineralogical and geochemical characteristics of the tailings solids, including the results of ARD and ML testing are provided in detail in the Mine Closure Plan that has been filed with the MNDMF. Laboratory pilot studies indicate that potential contaminants (arsenic and other dissolved metals) that may leach from the tailings solids will be successfully removed from TMF effluent prior to transfer to the CW. A process flow diagram for the TMF is presented on Figure 3.1.

3.1.1 Water Balance

The operation of the TMF will be based on the water balance developed during the design of the TMF. Table 3 summarizes the results of the model, which indicates that 90% of the water in tailings is recycled for re-use, and twice that amount, as a result of runoff and precipitation, must be treated and discharged.

Table 3 TMF Water Balance

In-Flow	***Volume (1000 x m^3/yr)***
Water in Tailings Slurry from Ore Processing	1,440
Water from Site	220
Water from Open Pit	500
Water from WRSP	500
Precipitation/runoff direct to TMF	1,750
Total In-Flow	***4,410***
Losses	
Water Retained in Tailings	450
TMF Seepage and Evaporation	200
Total Losses	***650***
Out-Flow	
Recycle to Processing Plant	1,290
Treatment and Discharge	2,470
Total Out-Flow	***3,760***
Total Losses + Total Out-Flow	***4,410***

The detailed monthly facility water balance is provided in Appendix B, including all runoff, seepage, process, utilization, evaporation, and discharge streams. The maximum daily discharge rate from the TMF will be 12,000 m^3/day.

3.1.2 Effluent Limits and Objectives

The proposed effluent discharge limits, monitoring program for surface and groundwater and the effluent discharge locations have been accepted by MOE as noted in the Assimilative Capacity Study (ACS) prepared by Consulting Ltd., dated August 15, 2009, which is presented in Appendix L. The table below summarizes the proposed effluent criteria from the ACS.

Table 4 Effluent Limits and Objectives

Effluent Parameter	*Daily Concentration Limits (mg/L)*	*Daily Concentration Objectives (mg/L)*
Cyanide	0.2	0.005
Total Copper	0.2	0.005
Total Nickel	0.6	0.025
Total Suspended Solids	25	15
Total Ammonia Nitrogen	10	5
pH of the effluent maintained between 6.0 to 9.5, inclusive, at all times		

The proposed effluent limits and monitoring requirements do not release ACME MR from complying with its obligations under O.Reg. 560/94 as amended.

The ACS was conducted with respect to MOE Policy B-1-5 Determining Receiving-Water Based, Point-Source Effluent Requirements For Ontario Waters (MOEE, 1994) and Water Management Policies, Guidelines, Provincial Water Quality Objectives (PWQOs) of the Ministry of Environment and Energy and Provincial Water Quality Objectives (MOEE, 1994). In addition, key elements of the Lakeshore Capacity Assessment Handbook Protecting Water Quality in Inland Lakes on Ontario's Precambrian Shield (Draft, MOE/MNR/MMAH, 2007) were taken into consideration in setting the Effluent Limits and Objectives. The following detailed information is included in the ACS in Appendix L:

- Hydrology of Neighbour Lake, including low/high flow analysis, water balance, aquatic life, seasonal flows, and mixing zones)
- Surface water quality goals
- Assessment of potential influence of Site discharges to Neighbour Lake
- Previous studies conducted on Neighbour Lake, including all water quality data collected within the lake and it's watershed
- Results of the7Q20 analysis to address criteria for continuous point source discharges from Neighbour Lake

Should elevated concentrations of contaminants be encountered in the discharge from the WRSP, it will be addressed through the TMF design and the wastewater contingency plan, as presented in Section 9.5.

3.1.3 Water Receiver

As previously discussed, the ultimate receiver of discharges from the Site will be Neighbour Lake. Neighbour Lake is located within the Big River watershed, which is in an area characterized by rolling till plains, drumlin fields, extensive rockland, numerous freshwater lakes, streams, bogs and wetlands. Forests are predominantly coniferous of red and black spruce. The complex system of streams, lakes, bogs and wetlands is a direct result of the underlying bedrock geology. The relatively impermeable and poorly jointed rocks results in slow groundwater recharge and most of the excess surface water is retained on the surface.

As discussed in the previous section, the ACS report (included in Appendix L) provides details of Neighbour Lake.

A summary table with Neighbour Lake's base water quality parameters for the contaminants of concern (COCs) relative to PWQO is presented in Table 5.

Table 5 Neighbour Lake Base Water Quality Parameters and PWQOs

Parameter	***Proposed Effluent Limit***	***Background at Neighbour Lake***	***PWQOs***	***MISA Effluent Limit***
Total Cyanide	200 µg/L	< 2.0 µg/L	5 µg/L	2000 µg/L
Total Copper	200 µg/L	< 2.0 µg/L	5 µg/L	600 µg/L
Total Nickel	600 µg/L	< 2.0 µg/L	N/A	1000 µg/L
Suspended Solids	25000 µg/L	< 1.0 µg/L	N/A	30000 µg/L
pH	6.0 – 9.5	5.11	6.5 – 8.5	N/A

N/A – Not Applicable

3.2 Physical Description

3.2.1 Dams

The Tailings Pond dams are rock fill embankments 6-16 m in height, which will extend a length of approximately 4,000 m around the perimeter of the Tailings and Water Reclaim Ponds. All dams were designed in accordance with the Dam Safety Guidelines of the Canadian Dam Safety Association (CDSA), as required under Part 4 of the Mine Rehabilitation Code. The maximum width of these dams will be 56 m at the base. All dams were designed with a minimum final crest width of 8 m. The operating dam slopes will be 1.5H:1V with re-sloping to 3H:1V at closure. The dams will have a 6 m wide core of compacted clay, which will be keyed 1.5 m into bedrock or impermeable soils. The rock fill to be used in the dam construction will be chemically inert waste rock generated by mining. Dam crest elevations were calculated based on operational schedules, operational parameters and the water balance. Table 6 presents a summary of the calculations conducted in setting the dam crest elevations for three stages during the active mining period. It should be noted that due to the extent of the TMF, wind and tidal effects assessments were not required. Construction, maintenance and decommissioning of all dams will be in accordance with the Dam Safety Guidelines of the CDSA.

Table 6: Main Dam Crest Elevation Calculations

Stage	***Year***	***Dead Storage & Annual Cumulative Tailings Production***			***Maximum Volume During 100 Year Wet Year***		***Emergency Spillway Elevation***	***Dam Crest Elevation***
		Annual Cumulative Tailings	***Minimum Pond + Tailings***	***Pond Elevation***	***Maximum Volume***	***Elevation***	***Invert Elevation***	
		(M-m^3)	***(M-m^3)***	***(m)***	***(M-m^3)***	***(m)***	***(m)***	***(m)***
I	1	0.97	1.47	117.5	1.92	118.5	120.5	122.0
	2	1.45	1.95	118.5	2.87	120.5		
II	3	2.90	3.40	120.5	3.81	121.5	123.0	124.5
	4	3.87	4.37	122.5	4.75	123.0		
III	5	4.93	5.43	123.5	5.70	124.5	124.5	126.0

Notes:

1. Operations start in the month of October
2. A minimum of 0.5 M-m^3 of effluent will be maintained in the pond at all times
3. The ground elevation at the upstream toe is 110.0 m
4. The internal pond volume from the deterministic flow model is 1.37 M-m^3
5. The minimum freeboard above the spillway invert is 1.5 m
6. The maximum volume of the effluent plus the tailings will be reached in the month of April

The Polishing Pond dams will be similar in construction to those in the Tailings Pond except that their height will be 4-6 m. The Polishing Pond dams will extend for a length of 750 m. The Polishing Ponds will make use of a natural hill on the western side in place of a man-made embankment. The hill is a drumlin composed of glacial till, the same material used to form the impermeable clay cores of the dams. Details pertaining to the design of the dams and dykes are presented in Appendix N.

3.2.2 Divider Dykes

Two divider dykes will exist at the TMF, one large structure between the Tailings and Reclaim Water ponds and one smaller structure between the Settling and Holding ponds. These dykes will be composed of the same waste rock used to construct the perimeter dams. They will have no clay core, as their purpose will be to contain solids (tailings or precipitate) while allowing water to pass through. The divider dyke configuration will provide an additional level of containment in the event of a dam failure. The crests of the divider dykes will generally be 2 m lower than that of the surrounding dams, level with the surface of the water.

3.2.3 Seepage Collection Structures

Seepage collection ditches will run down the west and east sides of the Tailings Pond on the outside of the perimeter toe road. The ditches will be 1 m deep, with 2H:1V side slopes and a 1 m wide bottom. Each ditch will be approximately 1,000 m in length and will drain to a central low point that follows the surrounding topography. The ditches will be armoured with waste rock to prevent erosion and have been designed to collect seepage through the Tailings Dam, which is estimated at 18 m^3/km/d. Portable pumps will be employed to pump any collected seepage back into the Tailings Pond as required.

3.2.4 Water Reclaim Structures

There will be two water reclaim structures at the TMF; one in the Water Reclaim Pond and one in the Holding Pond. Each will consist of a rock fill causeway with an integrated reclaim tower. The towers will be 2 m diameter sections of pre-cast culvert stacked vertically on a concrete pad. The bottom 6 m of culvert will be perforated to allow water to flow in. Vertical turbine submersible pumps will be installed in each tower to reclaim water. Operating, maintenance, and pipeline access will be via the causeways.

3.2.5 Spillways

There will be two spillways at the TMF, one spillway will provide overflow capacity from the Water Reclaim Pond to the Settling Pond and another spillway will permit discharge from the Holding Pond to the CW. The Water Reclaim Pond spillway will be a reinforced concrete trough installed in the crest of the dam at the southwest corner of the Water Reclaim Pond. The trough will measure 0.65 m deep and 4.0 m in width with a concrete thickness of 0.5 m. This spillway will be relocated with each dam raise.

The Polishing Pond spillway will be located in the east embankment, just south of the divider dyke separating the Settling and Holding Ponds. It will be similarly dimensioned to the Water Reclaim Pond spillway, except that the concrete foundation will extend a further 2 m into the dam. At the base of the foundation will be a 0.30 m diameter outflow pipe, which will permit water to flow by gravity to the CW. The outflow pipe will be fitted with a valve to control discharge as required. Drawings of the spillways are attached separately.

3.2.6 Pipelines

Two pipelines will discharge to the TMF, the Tailings Line and Pit Dewatering Line. The Tailings Line will be a 250 mm high-density polyethylene (HDPE) pipe, which will run down the plant access road, under the public road, and emerge on the dam crest at the northwest corner of the TMF. The Pit Dewatering Line will be a 100 mm HDPE pipe, which will run along the Waste Haul Road from the Open Pit and discharge from the dam crest into the Tailings Pond near the northwest corner of the TMF. All piping information is presented in the drainage and piping plan, attached separately.

The Tailings Line will split at the northwest corner of the TMF, with one branch running down the west embankment and the other running across the north embankment. The line will be valved, so that tailings can be discharged directly to the Tailings Pond via an emergency bypass at the northwest corner, to facilitate continued operation during pipeline maintenance.

Two pipelines will carry process water from the TMF back to the mill. These pipelines will be the 250 mm HDPE Process Water (PW) Line and the 100 mm HDPE Treated Water (TW) Line. The PW and TW Lines will originate at the Water Reclaim and Holding Ponds, respectively. Both lines will run along the perimeter toe road and then follow the same path as the Tailings Line to the Processing Plant.

The locations of the pipelines are presented on Drawing C-19, which is included in the specifications for the ETP, attached separately (Attachment 6).

3.3 Construction

Dam construction will begin with access to the TMF area being established as a result of the perimeter toe road construction. This road will act as a dam to contain sediment prior to the establishment of the Polishing Pond dam. The entire TMF area will then be cleared of standing timber and brush. The footprint for the dams will be grubbed and topsoil stockpiled. Organic materials and soil will not be removed from the tailing basin (area within the dams), as they will help reduce seepage when tailings are initially deposited.

A 6 m wide key trench will be excavated along the centerline of each dam. Where bedrock is exposed, the floor of the key trench will be slush grouted to seal any cracks. Detailed geotechnical drilling will be

conducted in areas where bedrock is more than 1.5 m beneath the surface. In such areas, impermeable soils forming the bottom of the trench will be compacted or holes drilled and filled with cement down to bedrock, forming a "grout curtain".

Once sealed, the key trench will be filled with compacted clay so that it is level with the prepared dam footprint. From this point forward, the dam will be raised in 0.3 m lifts of compacted waste rock, with the core similarly being constructed out of clay. Care will be taken to ensure that "clean" (low arsenic) waste is used to construct the downstream toe of the dams to avoid long-term water quality issues. Material used to build the upstream dam slopes will be within the containment provided by the clay core.

The Polishing Pond dams will be constructed first to act as a sedimentation pond for any water that may be discharged during dam construction. As the "starter dam" is raised, runoff from surrounding areas and mine water from the Open Pit will accumulate behind the dam. By the time dam construction is complete, sufficient water (minimum 300,000 m^3) will have been stored to start the mill up without drawing from surrounding lakes or streams.

The Polishing Pond dams will be constructed to full height (max 6.0 m) during the construction period. The Tailings Pond dam will be raised in stages, ensuring that a minimum of one year of storage capacity in excess of upcoming annual requirements is always on hand to manage extreme flow conditions. After initial construction, suitable material for dam building will be selected from the Open Pit. Clay for the Tailings Pond dam core will be stockpiled at the WRSP and reclaimed as required. The divider dyke, reclaim causeway, and spillway in the Tailings Pond will be raised to keep pace with each stage of development. Appendix D presents Site Plans for the TMF as it will be developed year-to-year.

3.4 Operation

3.4.1 Tailings Deposition

Tailings will be discharged from the end of the Tailings Line via a three-spigot header pipe. Spigots will be separated by 50 m so that discharge can fill an area 150 m in width from each location. Discharge will begin at the southwest corner of the Tailings Pond, adjacent to the divider dyke. The header pipe will be relocated 100 m northwards every 14 days, until the discharge point reaches the northwest corner of the Tailings Pond. At that time, the unused pipe on the west embankment will be relocated to the east embankment and filling will continue in a similar fashion on the east dam, moving south to north.

Frequent (bi-weekly) movement of the discharge point develops uniform coverage along the toe of the dam wall, which will act to reduce seepage. Excess tailings will flow into the centre of the pond sealing the basin floor in a similar manner. This practice also reduces the possibility of ice lenses forming in the tailings beach, which lowers in-situ tailings density and reduces storage capacity.

3.4.2 Water Flow

Tailings will be deposited at the Tailings Pond in slurry form (50% solids), at a rate of 270 m^3/hr. Forty-seven percent of the water in the slurry will become trapped in the pores within the tailings and will settle with the solids. The remaining 53% will become free water, available for recycle or discharge.

The Water Reclaim Pond has been designed to operate with a capacity of 500,000 m^3. For eight months of the year, from April to November, water will be both reclaimed for use in processing (180 m^3/hr) and treatment prior to discharge (250 m^3/hr). At these rates of discharge, water will be retained in the Tailings Pond/Water Reclaim Pond area for 48 days. During the winter, from December to March, no water will be discharged. Withdrawal from the Reclaim Water Pond will be limited to 180 m^3/hr for processing, so water is retained in the Tailings Pond/Water Reclaim Pond area for 115 days.

Water pumped to the ETP for treatment will be discharged to the Polishing Ponds, where it will be retained for a further 25 days to permit settling and assure quality requirements are met prior to discharge to the CW. For an average year, 1.4 million m^3 of water will be recycled for processing and 1.5 million m^3 of water will be treated and discharged. A detailed water balance for the TMF can be found in Appendix B.

3.4.3 Water Reclaim

Water will be reclaimed for use in processing from two locations at the TMF. As previously mentioned, water will be withdrawn continuously from the Water Reclaim Pond at a rate of 180 m^3/hr. In addition, a further 20 m^3/hr of treated water will be withdrawn from the Holding Pond for use in gland seal pumps and reagent mixing. This accounts for 99.9% of all water used on-Site. The only water application on-Site not employing recycling will be potable water, which will be hauled in or provided by rainwater collection.

Treated water will be reclaimed to a 700 m^3 storage tank at the mill. Process water will be reclaimed to a 19,000 m^3 storage pond also at the mill. This storage pond will act in a dual role to collect potentially contaminated runoff from the Site. The pond will normally run at 50% capacity. In extreme rain events, the storage pond level will be managed to avoid exceeding capacity. Any extra flow will be discharged to the Tailings Pond. Details regarding the design and management of the Process Water Pond are provided in Appendix E.

3.4.4 Pond Levels

The normal operating water level for the Water Reclaim Pond will be 1 m below the bottom of the spillway invert. The Water Reclaim Pond will be able to safely operate with the water level as high as 0.5 m above the bottom of the spillway invert. In this case, the excess water will flow down the spillway to be contained in the Polishing Ponds.

The normal operating water level for the Polishing Ponds will be 2 m below the spillway invert at an elevation of 111 m above sea level (ASL). The maximum planned water level in the Polishing Ponds will be 112 m ASL. At this elevation there will still be 1 m of freeboard between the Holding Pond surface and the bottom of the spillway invert.

Allowances for extreme inflows are discussed in Section 8.5, Waste Water Contingency.

3.4.5 Storage Capacity

The Tailings Pond has been designed with a final total volume of 5.8 million m^3. This volume will be sufficient to store 4.9 million m^3 of tailings, equivalent to the processed volume of the present ore reserve, plus 500,000 m^3 of free water in the Water Reclaim Pond, and design surge capacity to manage extreme inflows. The Polishing Ponds will have a normal operating capacity of 150,000 m^3 with an allowance for a variance of up to an additional 100,000 m^3 to accommodate normal fluctuations in the pond level due to varying operating conditions.

A simplified schedule showing the relative elevation of the dam crest, spillway inverts, and beach/pond level based on an annual dam raising is shown in Table 7. The design Stage Filling Curves for the Tailings and Polishing Ponds are provided in Appendix B.

Table 7 Simplified TMF Filling Schedule

Year	*Elevation (m ASL)*			*Storage Volume (M m^3)*		*Surge Capacity (M m^3)*	
	Pond/Beach	*Spillway*	*Dam Crest*	*Tailings*	*Water*	*Design*	*Operating*
1	120	121	122	1.0	0.5	0.4	1.0
2	121	122	123	2.0	0.5	0.4	1.0
3	122	123	124	3.0	0.5	0.4	1.0
4	123	124	125	4.0	0.5	0.4	1.0
5	124	125	126	5.0	0.5	0.4	1.0

Notes: 1) Volumes are rounded and elevations are shown to the nearest even metre
2) Operating surge capacity is based on building dams up one year in advance of filling

4.0 WASTE WATER MANAGEMENT

The wastewater treatment process has four stages of treatment. These stages are: cyanide destruction, impoundment, effluent treatment, and wetland attenuation. These treatment processes have been designed such that the proposed Effluent Limits and Objectives identified in Table 4 will be achieved, including Weak Acid Dissociable (WAD) Cyanide (C_{WAD}), Total Suspended Solids (TSS), and Total Ammonia Nitrogen.

4.1 Cyanide Destruction

4.1.1 Process Chemistry

Following cyanidation in the CIL circuit, tailings will be detoxified prior to transfer to the TMF. Detoxification will be achieved with the use of the SO_2/Air process. The chemical reaction is as follows:

$$CN^- + SO_2 + O_2 + H_2O \rightarrow CNO^- + H_2SO_4$$

Cyanide + sulfur dioxide + oxygen + water → cyanate + sulfuric acid

The reaction requires agitation, a sulfur source and oxygen, copper present to catalyze the reaction, and pH of 8-9. The sulfur dioxide will be created from sodium metabisulfite (SMBS). Low-pressure air will be bubbled through the slurry to provide oxygen. Copper will be provided in the form of copper sulfate and hydrated lime, and will be used to maintain proper pH.

The SO_2/Air process will oxidize "free" cyanide to cyanate, which is 100 times less toxic than cyanide. Cyanate will break down readily into carbon dioxide and ammonium. Management of this process is discussed in Section 4.3.3. The sulfuric acid generated will be neutralized with hydrated lime creating insoluble calcium sulfate (gypsum), which will be deposited with the tailings.

4.1.2 Process Circuit

Following the CIL circuit, the barren slurry will flow through a carbon safety screen, to collect any fine carbon, and into a pair of 200 m^3, mild steel reaction tanks. The tanks will be arranged in series, in a cascade configuration. Slurry will flow from the first to second tank by an overflow launder.

In the first reaction tank, SMBS and copper sulfate will be added to promote the cyanide destruction reaction and hydrated lime will be used to control pH. Low-pressure air will be sparged into the tanks to provide oxygen. Reagent dosing will be automatic. Hourly checks of density and pH will ensure proper operation.

4.1.3 Design Criteria

The density of the slurry will be 50% solids by weight and fed at a rate of 188 tph solids or 376 tph (255 m^3/hr) slurry. The average CN_{WAD} concentration will be 100 parts per million (ppm) CN_{WAD} with a maximum concentration of 200 ppm CN_{WAD}. Total residence time in the circuit will be 1.5 hours. Reagent consumptions will be 1.24 kg/t of SMBS, 0.07 kg/t of copper sulfate, and 0.9 kg/t of hydrated lime.

The target cyanide concentration for the design is 5 ppm CN_{WAD}. This is a typical industry design target where most ores are less amenable to cyanide destruction than those at Precious Metals Mine. It is conservatively anticipated that cyanide concentration in tailings reporting to the TMF will be in the range of 0.5 – 1.5 ppm CN_{WAD}.

4.2 Natural Degradation of Cyanide

4.2.1 Overview

The natural degradation of cyanide is a well-understood process commonly used in industry to detoxify cyanide effluents. It involves the breakdown of metal-cyanide complexes followed by the volatilization of hydrogen cyanide (HCN) gas. The process also includes some biological and photochemical degradation.

4.2.2 Estimate

Tailings discharged to the Tailings Pond will have cyanide levels less than 1.5 ppm CN_{WAD}. The residence time for the tailings effluent will be 7-20 weeks prior to recycle or withdrawal for treatment and discharge, depending on season. Based on established behaviour, estimates were developed for cyanide concentrations in the Tailings and Polishing Ponds. These estimates are provided in Appendix F.

4.2.3 Projected Concentrations

The estimates indicate that with an input concentration of 1.5 ppm CN_{WAD}, the CN_{WAD} concentration in the Tailings and Polishing Ponds will be approximately 0.5 ppm and 0.4 ppm CN_{WAD}, respectively. These estimates are admittedly conservative. Laboratory test results indicate that the cyanide destruction from this process is typically close to 0.5 ppm CN_{WAD} without accounting for the benefit of natural degradation. At this feed concentration, the CN_{WAD} concentrations in the Tailings and Polishing Ponds will be less than 0.5 ppm and 0.2 ppm CN_{WAD} respectively (these concentrations are below the proposed effluent limits and objectives identified in Table 4).

4.3 Soluble Copper Management

4.3.1 Overview

Negligible levels of naturally occurring copper exist at the Mine. As discussed in Section 4.1.1, copper will be added in the form of copper sulfate to catalyze the cyanide destruction process. Soluble copper in concentrations greater than 0.3 ppm as metal ions or cyanide complexes is toxic to aquatic life. Naturally occurring chemical processes in the Tailings Pond will ensure that soluble copper concentrations remain below allowable levels. Never-the-less, actions have been considered in the event that soluble copper concentrations in the effluent exceed discharge limits.

4.3.2 Tailings Pond Conditions

The Tailings Pond conditions were modelled based on the results of laboratory testing. The effluent resulting from SO_2/Air cyanide destruction will have substantial concentrations of sodium and calcium cations, sulfate, and cyanate, a high bicarbonate/carbonate buffering capacity, and a pH of 8.1-8.7.

The most significant factor affecting the alkalinity will be the degree of cyanate breakdown. The greater the hydrolysis of cyanate, the higher the expected pH will be. Higher pH leads to the formation of ammonia and copper-ammonia complexes rather than non-toxic ammonium.

4.3.3 Management Plan

Modelling indicates that should 100% of the cyanate hydrolyze in the Tailings Pond, pH adjustment with mineral acid would be required to reduce the pH to a range of 6.5-7.6. pH in this range would encourage maximum natural degradation of cyanide, breakdown weak acid dissociable copper-cyanide complexes, and promote the formation of ammonium rather than ammonia. Following this, pH in the Polishing Ponds would be raised to a range of 8.0-8.5 to minimize the soluble copper and precipitate it as copper hydroxide, along with the other insoluble products of effluent treatment.

It should be noted that acidification of the Tailings Pond will only be undertaken if high copper and ammonia levels are experienced. If hydrolysis of cyanate is more gradual, it is reasonable to expect that copper and ammonia levels in the tailings effluent will reach acceptable levels prior to transfer to the CW. The basis for this management approach to soluble copper and ammonia compounds is provided in Appendix G.

4.3.4 Contingency Plan

750 tonnes per year (tpa) (or about 2 tonnes per day (tpd)) of sulfuric acid would be required to acidify the Tailings Pond sufficiently, assuming 50% hydrolysis of cyanate. Dosing could be arranged to occur after cyanide destruction or at the discharge to the Tailings Pond. Sufficient surge capacity will exist in

the Tailings Pond to allow sufficient time for the dosing arrangements to be put in place, once it was determined that the need existed.

To raise pH in the Polishing Ponds, 225 tpa of hydrated lime would be required. This would be achieved using the existing lime handling facilities in the ETP and added directly the ETP discharge.

4.4 Arsenic Treatment

4.4.1 Overview

The third stage of wastewater management following the cyanide destruction and the natural chemical processes occurring during impoundment in the Tailings Pond, will be effluent treatment. The objective of effluent treatment is to remove arsenic and other dissolved metals from the effluent prior to transfer to the CW. The design of the treatment system was conducted by ABC Designs Ltd. and was based on the laboratory test work performed by LabWorks.

4.4.2 Process Description

The effluent treatment process involves the precipitation of dissolved arsenic, arsenic occurring as suspended solids, and the co-precipitation of metal-cyanide complexes. Ferric sulfate is added to tailing water to form highly insoluble ferric arsenates, of the general form $FeAsO_4xFe(OH)_3$. A flocculant will be added to help bind the precipitates and assist settling. Lime will be added to neutralize the acidity resulting from the hydrolysis of ferric iron. If necessary, hydrogen peroxide will be added to oxidize arsenite to arsenate. Reagent consumptions are provided in the detailed design description included in Appendix H.

4.4.3 Treatment System Description

Water will be withdrawn from the reclaim structure in the Water Reclaim Pond and pumped to the ETP, located on the low hill forming the western wall of the Polishing Ponds. The ETP has been designed to manage an average flow of 350 m^3/hr and a peak flow of 450 m^3/hr. In a typical year, the ETP will treat approximately 250 m^3/hr of effluent.

Treatment will occur in two concrete, 225 m^3 agitated reaction tanks. Lime and flocculant will be mixed in separate tanks and dosed as required. Ferric sulfate and hydrogen peroxide will be dispensed from 1 tonne individual bulk containers (IBCs) called totes. Residence time in the ETP will be approximately 1-2 hours, depending on the feed rate.

The treated effluent will be discharged to the Settling Pond where the resulting precipitate drops out of suspension. The Settling Pond has a recommended required volume of 15,000 m^3 which includes sludge

(precipitate) storage capacity. The pond has an actual design volume of 150,000 m^3. Clarified water will decant over the rock fill divider dyke to the Holding Pond, which is similarly sized.

A nominal amount of treated water (20 m^3/hr) will be continually withdrawn from the Holding Pond to a storage tank at the mill for use in the Processing Plant. Excess water meeting discharge requirements will be transferred by spillway and pipeline to the CW. All of the process water requirements for milling can be met by pumping from the Holding Pond.

4.4.4 Performance

Effluent treatment performance has been based on the laboratory test work documented in Appendix H. The arsenic concentration is expected to be reduced from approximately 0.5 ppm to less than 0.2 ppm. The concentrations of cyanide and other metals of interest are similarly reduced. Expected concentrations of contaminants compare favourably with the proposed effluent limits and objectives identified in Table 4.

4.5 Containment Cell Design

4.5.1 Overview

The effluent treatment produces waste sludge that will contain ferric arsenate, copper hydroxide, and ferro-cyanide complexes. Storage of this material must ensure containment and a stable environment that discourages remobilization of contaminants. Historic mine tailings excavated during development of the Open Pit contain high levels of arsenic and trace mercury and require similar conditions to be stored safely. Engineered structures called containment cells will be used to contain this potentially harmful waste within the TMF.

4.5.2 Location and Capacity

The containment cells will be located in the northeast corner of the TMF. The design of the cells has been integrated into the Tailings Pond embankments that will extend along the north and east sides of the TMF. The cells will be approximately 275 m x 135 m, covering 3.5 ha. The total designed capacity is 20,000 m^3, which will allow for 1,900 m^3 of ETP sludge for five years of operation, 1,500 m^3 of ETP sludge for two years after closure, 5,000 m^3 of historic mine tailings, and a contingency.

4.5.3 Construction

The cells will be earthfill structures that will be 4 m in height. Each 2,500 m^3 cell has been designed with 2 m of sludge storage depth between 1 m thick clay top and bottom liners. The cell will be formed by a clay embankment 4 m in height with 3H:1V slopes. The embankment will be armoured with rock to

resist erosion and covered with soil and then vegetated. The clay used in the construction of the cells will be the same material used for the Tailings Pond dam core. The clay has a permeability of 1 x 10^{-8} m/s.

4.5.4 Operation

The cells will be constructed in 2,500 m^3 increments with 5,000 m^3 of storage initially planned to handle historic tailings and the waste generated during the first year of operation. The Settling Pond at the ETP will be cleaned out annually during the December-March period when treatment will be suspended. Sludge will be allowed to dewater either through conventional or freeze-drying. Runoff will be collected in a sump and pumped out of the cells into the TMF where it will mix with tailings effluent and be subject to treatment.

A complete description of the design and operation of the containment cells is provided in Appendix I.

4.6 Constructed Wetland

4.6.1 Overview

The Constructed Wetland (CW) will be the last stage of the effluent treatment flow process. It will cover an area of 15 ha and will be located southeast of the Polishing Ponds. It will provide the effluent with additional treatment capacity through the application of natural biochemical processes to the Polishing Ponds effluent in a created wetland environment.

It should be noted that the CW will not be required to provide ongoing treatment to Site drainage after closure, although the natural processes in the system will continue to function on their own accord. In the view of the designers, the nature of the design, the quality of habitat created, and natural setting will allow the CW to provide excellent value in terms of compensating for land disturbed by mining activities. A complete description of the CW design is included in Appendix J.

4.6.2 Description

Water discharged to the CW will leave the Polishing Ponds via an integrated spillway/cascade aerator. The cascade aerator will be a series of concrete steps 0.7 m high and 14 m wide, which will create turbulent flow, oxygenating the water and promoting the oxidation of ferric iron and ammonia. A bottomless culvert will provide pipe and vehicle access across the small discharge spillway stream separating the CW from the Polishing Ponds. Water will discharge into the "forebay", a 1 ha surge pond, where sediment will settle and water will feed the first cell.

The CW will be composed of three cells, each approximately 3 ha in area. The first two will be fed by weir boxes and header pipes to ensure short-circuiting does not occur. The third cell will be fed by a

flow-through rock fill dyke. A similar arrangement will provide a diffuse discharge from cell three, which will reduce flow velocity and prevent erosion. The CW will be separated from the shoreline of Neighbour Lake by a 100 m wide natural wetland that will serve to screen the facility from view and will meet the required MOE Guideline D-2 separation distance requirement. This area is a boulder field, which acts as a natural "French drain" for existing runoff.

4.6.3 Performance

The performance of man-made wetlands in the attenuation of contaminant concentrations is well documented. The CW is expected to reduce dissolved arsenic and ionized ammonia by 30% and dissolved metal concentrations (Al, Fe, Cu, and Pb) by at least 50%. The CW will also serve to remove sediment, dissolved nitrogen, and buffer pH, which is expected to be reduced from 8.0-8.5 at influx to 7.5 at exit.

4.6.4 Construction

The CW area will be cleared and grubbed prior to excavation. The lakeshore buffer zone will not be cleared, allowing it to remain in its natural state. Cut and fill will be used to create basins (cells) 1 m deep bounded by embankments 1 m high providing a total depth of 2 m. The cells will be lined with 0.3 m of clay and pre-cast weir boxes and piping will be installed. Waste rock from the Open Pit will be used to construct the flow-through dykes. Grubbings and organic waste from clearing will be mulched to provide rootmass. When earthworks are completed, the CW will be seeded.

4.6.5 Operation

The CW has been designed to accept average flows of 250 m^3/hr and peak flows of 500 m^3/hr. The operating depth of the CW will be approximately 0.3 m. The designed retention time of the CW will be 4.3 days. The CW will be a passive system that does not require active operation in order to function. Visual monitoring and sampling of water quality should be conducted on a daily and weekly basis, respectively, to ensure proper operation. The only maintenance activities required will be the cleaning of sediment from the forebay every two years, exercise of the weir boxes, and periodic inspections of the cascade aerator.

4.7 Sanitary Sewage Works

Sanitary sewage produced on-Site will be stored in holding tanks. The holding tanks will be buried adjacent to buildings with toilet facilities. Sewage will be collected and transported to appropriate off-Site disposal facilities.

5.0 SURFACE WATER

5.1 Surface Water Monitoring

5.1.1 Purpose

A Surface Water Monitoring Plan has been developed for the Site and is included in Appendix K. Monitoring will be conducted to determine the effects, if any, of sedimentation, contamination from blasting and Open Pit water, and contamination from spills of hazardous materials on Site. The Surface Water Monitoring Plan has been developed based on the results of the ACS on Neighbour Lake. A copy of the Assimilative Capacity Analysis Report is included in Appendix L.

5.1.2 Locations

The eleven sampling locations selected for surface water monitoring are identified in Table 8 and are presented on Figure 1.3. The eleven sampling locations will be located in four main areas; Big River, which is adjacent to the Site; Round Lake, given its proximity to the Site despite the fact that it is not involved in operations; Neighbour Lake, the receiving waters for treated Mine effluent; and the Unnamed Tributary to Big River that flows through the Site west of the WRSP and TMF.

Table 8: Local Surface Water Monitoring Station and Monitoring Frequency

Station ID	*Location*	*Location Rationale*	*Monitoring Frequency*
SW-11	Big River upstream of project Site	To characterize surface water upstream of Site	Monthly during discharge period
SW-1	Big River at Site boundary along Big River Road (baseline monitoring location)	To characterize surface water adjacent to Site	Monthly during discharge period
SW-2	Big River downstream of project Site (baseline monitoring location) at bridge crossing	To characterize surface water below the Site	Monthly during discharge period
SW-3	Unnamed tributary to Big River (baseline monitoring location) located downstream of project Site	To characterize surface water leaving Site	Monthly during discharge period
SW-12	Outflow from Neighbour Lake	To characterize surface water below Middle Lake	Monthly during discharge period
SW-13	Outflow from Neighbour Lake at dam	To characterize surface water leaving Neighbour Lake	Monthly during discharge period
SW-14	Discharge from Constructed Wetland	To characterize water quality leaving the wetland	Monthly during discharge period
SW-15	Water inflow to the Tailings Pond	To characterize water quality as water enters the Tailings Pond	Monthly during discharge period
SW-16	Water outflow from the Water Reclaim Pond	To characterize water quality leaving the Water Reclaim Pond for reuse and analyze the efficiency of the Tailings Pond	Monthly during discharge period
SW-17	Water outflow from the Holding Pond	To characterize water quality and ensure water is safe for general use	Monthly during discharge period

Station ID	*Location*	*Location Rationale*	*Monitoring Frequency*
SW-18	Discharge to the Constructed Wetland	To characterize water quality before water enters the Constructed Wetland	Monthly during discharge period

Locations SW-15 through 18 will not be monitored after the Processing Plant is shut down as that monitoring condition of the C of A will no longer be applicable. Full details of the post-closure surface water monitoring program are provided in the Mine Closure Plan that has been filed with the MNDMF.

5.1.3 Monitoring

Monitoring at each location will be conducted monthly, during the discharge period, per Table 9. Sampling will employ procedures accepted by MOE. Analysis will examine general chemistry, metals, total suspended solids, fluoride, alkalinity, cyanide, and nutrients. A summary of the Surface Water Monitoring Program is presented in Table 9.

Table 9: Local Receiver Water Monitoring Program

Frequency	**As specified in Table 8.**
Sample Type	***Grab Samples***
Parameters	Lab: Nickel, Copper, Total Ammonia Nitrogen, Total Kjeldahl Nitrogen (TKN), Total Cyanide, Weak Acid Dissociable (WAD) Cyanide, Mercury, Fluoride, metals scan (to include as a minimum As, Zn, Cu, Ni, Pd and Cd), hardness, alkalinity, Total Suspended Solids (TSS), Total Dissolved Solids (TDS), nutrients; Nitrogen, Phosphorus and Sulfur, pH, conductivity Field: pH (effluent pH to be maintained between 6.0 to 9.5, inclusive, at all times), temperature, conductivity and dissolved oxygen

5.1.4 Monitoring at Closure

Rehabilitation entails all of the activities described in the preliminary reclamation plan. In brief, this will include the removal of all buildings and infrastructure, flooding of the Open Pit, recontouring of the WRSP, draining and capping of the TMF, re-vegetation of all disturbed areas, and treatment of Site drainage until water quality returns to that which existed prior to development. Surface water and groundwater monitoring will continue after operations at the Site have ceased. The monitoring locations and frequency of monitoring after closure are presented in the previous sections of this report. Post-closure monitoring (i.e. after the monitoring condition of the CofA is no longer applicable) will be required under the Mine Closure Plan, as filed and cleared with the MNDMF.

5.1.5 Reporting

An annual report of the surface water monitoring results will be completed and submitted to MOE for review. In addition, MOE will receive copies of all surface water monitoring data reported to Environment Canada to satisfy requirements under the Metal Mining Effluent Regulations (MMER). The Surface Water Monitoring Plan is provided in its entirety in Appendix M.

5.2 Erosion and Sediment Control Plan

5.2.1 Purpose

An Erosion and Sediment Control Plan has been created for the development of the Site. The plan is based on the guidelines found in the "Erosion and Sedimentation Control Handbook for Construction Sites", issued by MOE. The objective of the plan is to ensure that the Site development minimizes sediment and erosion, and effectively controls any which may occur.

5.2.2 Guiding Principles

The Erosion and Sediment Control Plan has been developed to achieve its objective by adhering to four guiding principles. These are:

- Keep water clean
- Minimize amount of exposed soil
- Minimize the time bare soil is exposed
- Retain sediment on Site

5.2.3 Plan Structure

The Erosion and Sediment Control Plan breaks the fifteen month Site development into five, three month periods. Each period corresponds to a number of activities that will occur sequentially in the development of the project. Each activity will affect different areas of the project Site, which are shown on a Site plan for that period. The environmental controls to be applied to each activity are described in the accompanying text. The environmental controls and their implementation can be classified by the following five topics:

- Water management
- Erosion control
- Sediment control
- Construction scheduling
- Contingency planning

5.2.4 Nature of the Plan

The Erosion and Sediment Control Plan is a "living document". It provides an effective framework for managing erosion and sediment in the development of the Mine. At the time of development, the plan may be adapted to allow for changes in Site conditions, development schedule, or considerations for what constitutes best management practice in the view of ACME MR, Consulting Ltd, and the Agencies. The Erosion and Sediment Control Plan is provided in its entirety in Appendix C.

6.0 GROUNDWATER

6.1 Groundwater Monitoring

A groundwater monitoring plan was developed by Clean Water Consultants and is provided in its entirety in Appendix M. The purpose of the plan is to establish a long-term groundwater monitoring program for the TMF and Open Pit. The installed wells will be used to determine baseline conditions prior to the start of mining and tailings deposition and to provide long-term surveillance of water levels and chemistry as operations progress. These wells will also form part of the post-mining monitoring program. A detailed geotechnical investigation was conducted at the Site prior to the development of the groundwater monitoring plan. A copy of the Geotechnical Analysis Report documenting the subsurface conditions at the Site is included in Appendix N. A summary of the groundwater monitoring program is provided in Table 10. Groundwater monitoring well locations are shown on Figure 1.3.

Table 10: Summary of Groundwater Monitoring Program

Sample Location	***Well ID***	***Parameters for Analysis***	***Sample Frequency***
Open Pit	OPM-1A/B, OPM-2A/B, OPM-3A/B	Lab: Total Cyanide, Weak Acid Dissociable (WAD) Cyanide, Copper, Nickel, Total Suspended Solids (TSS), Total Ammonia Nitrogen, Full metal ICP, Major Ions, Full Metal ICP, Metal Hydrides, Conductivity, pH, Alkalinity, Ammonia, Nitrate, Nitrite, Total Kjeldahl Nitrogen, Carbon Oxygen Demand (COD), Ion Balance, Hardness, Sodium-Sulfates, Total Petroleum Hydrocarbons, Mercury, Biological Oxygen Demand (BOD) Field: pH (effluent pH to be maintained between 6.0 to 9.5, inclusive, at all times), temperature, conductivity and dissolved oxygen	Annual (Spring)
Tailings Stage 1 (an additional 4 to 6 well pairs as the dam is raised to its final elevation during the first 4 years of operation)	TMW-1A/B, TMW-2A/B, TMW-3A/B, TMW-4A/B, TMW-5A/B, TMW-6A/B, TMW-7A/B, TMW-8A/8B	Lab: Total Cyanide, Weak Acid Dissociable (WAD) Cyanide, Copper, Nickel, Total Suspended Solids (TSS), Total Ammonia Nitrogen, Major Ions, Full Metal ICP, Metal Hydrides, Conductivity, pH, Alkalinity, Ammonia, Nitrate, Nitrite, Total Kjeldahl Nitrogen, Carbon Oxygen Demand (COD), Ion Balance, Hardness, Sodium-Sulfates, Total Petroleum Hydrocarbons, Mercury, Biological Oxygen Demand (BOD) Field: pH (effluent pH to be maintained between 6.0 to 9.5, inclusive, at all times), temperature, conductivity and dissolved oxygen	Quarterly (Spring, Fall, Summer, and Winter)
Background Wells	TMW-9A/B	Lab: Total Cyanide, Weak Acid Dissociable (WAD) Cyanide, Copper, Nickel, Total Suspended Solids (TSS), Total Ammonia Nitrogen, Major Ions, Full Metal ICP, Metal Hydrides, Conductivity, pH, Alkalinity, Ammonia, Nitrate, Nitrite, Total Kjeldahl	Quarterly (Spring, Fall, Summer, and Winter)

Sample Location	*Well ID*	*Parameters for Analysis*	*Sample Frequency*
		Nitrogen, Carbon Oxygen Demand (COD), Ion Balance, Hardness, Sodium-Sulfates, Total Petroleum Hydrocarbons, Mercury, Biological Oxygen Demand (BOD) Field: pH (effluent pH to be maintained between 6.0 to 9.5, inclusive, at all times), temperature, conductivity and dissolved oxygen	
Future Wells (to be installed after final dam elevation)	TMW-10A/B, TMW-11A/B, TMW-12A/B, TMW-13A/B, TMW-14A/B	Lab: Total Cyanide, Weak Acid Dissociable (WAD) Cyanide, Copper, Nickel, Total Suspended Solids (TSS), Total Ammonia Nitrogen, Major Ions, Full Metal ICP, Metal Hydrides, Conductivity, pH, Alkalinity, Ammonia, Nitrate, Nitrite, Total Kjeldahl Nitrogen, Carbon Oxygen Demand (COD), Ion Balance, Hardness, Sodium-Sulfates, Total Petroleum Hydrocarbons, Mercury, Biological Oxygen Demand (BOD) Field: pH (effluent pH to be maintained between 6.0 to 9.5, inclusive, at all times), temperature, conductivity and dissolved oxygen	Quarterly (Spring, Fall, Summer, and Winter)
QA/QC Samples (One QA/QC sample/blank per sample round)		Lab: Total Cyanide, Weak Acid Dissociable (WAD) Cyanide, Copper, Nickel, Total Suspended Solids (TSS), Total Ammonia Nitrogen, Major Ions, Full Metal ICP, Metal Hydrides, Conductivity, pH, Alkalinity, Ammonia, Nitrate, Nitrite, Total Kjeldahl Nitrogen, Carbon Oxygen Demand (COD), Ion Balance, Hardness, Sodium-Sulfates, Total Petroleum Hydrocarbons, Mercury, Biological Oxygen Demand (BOD) Field: pH (effluent pH to be maintained between 6.0 to 9.5, inclusive, at all times), temperature, conductivity and dissolved oxygen	Quarterly (Spring, Fall, Summer, and Winter)

Monitoring wells TMW 9 through 14 will continue to be monitored after the Processing Plant shuts down. Full details of the post-closure groundwater monitoring program are provided in the Mine Closure Plan that has been filed with the MNDMF.

6.1.1 TMF Monitoring Wells

The proposed monitoring well network will consist of nine wells nominally spaced 300 m apart around the perimeter of the TMF. The purpose of these wells will be to define background chemistry and detect gradual changes in groundwater chemistry that may indicate seepage from the TMF.

The spacing is based on the Site topography, which provides an indication of potential pathways for subsurface flow. Initially, two wells will be sited on the west and east sides of the TMF and four along the east and south sides of the Polishing Ponds. Once filling commences, two more wells will be

established on the west side of the TMF, one on the east side, and one in the drumlin forming the west wall of the Polishing Ponds, bringing the total number of monitoring wells to thirteen.

Each monitoring well will consist of two nested, 51 mm PVC piezometers, one 6-9 m deep, screened across the bedrock/till interface and one 30-32 m deep, screened across deeper fracture zones. Wells will be drilled using a track-mounted, HW geotechnical core drill (or equivalent) and will be subjected to hydraulic testing, survey, and baseline water chemistry sampling upon installation.

6.1.2 Open Pit Monitoring Wells

The Open Pit monitoring wells will be comprised of three pairs of wells consisting of a shallow well 15-20 m deep and a deep well, 120 m below depth. The wells will be spaced evenly around the western side of the Open Pit between the excavation and the Big River. The purpose of these wells will be to monitor bedrock water levels and gradients between the Open Pit and the Big River during the mine life and to assess changes in bulk hydraulic conductivity as mining progresses. A fourth well will be established to act as a control near the northern crossing of the Big River.

Each well nest will consist of a deep and shallow well, 152 mm in diameter. The deep wells will be cased for the top 20 m and will be equipped with water level data loggers to provide continuous monitoring of downhole conditions. The shallow wells will be of similar diameter, employing slotted screen PVC surrounded by a sand pack, with a bentonite plug straddling the overburden/bedrock interface.

6.1.3 Monitoring

Monitoring will consist of both water level monitoring and groundwater sampling and analysis. Water level monitoring will include both automated and manual measurements, taken at an initial frequency of hourly and daily, increasing to quarterly measurements after 2-3 months of observation.

Water samples will be taken with bailers or Hydrasleeve samplers. Measurements and analyses will include temperature, pH, electrical conductivity, dissolved metals, mercury, cyanide, nitrogen compounds, and petroleum hydrocarbons. Recognized sampling procedures including the use of blanks and duplicates to ensure Quality Assurance/Quality Control (QA/QC) will be employed. All sampling and monitoring will be recorded and documented.

6.2 Domestic Well Management

The development of the Site will involve the acquisition of all residential properties by the proponent and the removal of all dwellings. The nearest permanent dwelling is 6 km north (upgradient) of the Site. The nearest seasonal dwelling is 3 km north (upgradient) of the Site. No domestic well management activities are required for Site development.

7.0 MANAGING ENVIRONMENTAL IMPACTS

The TMF location was assessed in accordance with MOE Guideline D-2, *Compatibility Between Sewage Treatment and Sensitive Land Use*, to ensure that the separation distance between the TMF and land adjacent to the TMF (classified as sensitive land use) meets the guideline for the "Waste Stabilization Ponds" category. The TMF does not require special noise and odour control facilities and/or equipment; therefore the separation distance was assessed (during the pre-application consultation with the MOE) to be a minimum of 100 m. The TMF conforms to this requirement.

Air and noise emissions from the mining activities at the Site have been discussed in detail in the Application for C of A (Air and Noise) dated September 6, 2009 and submitted to the MOE. The Application for C of A (Air and Noise) concludes that the Site can operate in compliance with the MOE NPC-205 Noise Guidelines and the O.Reg. 419 Standards.

No water will be discharged directly from the Open Pit to the environment. Water will be diverted around the Open Pit or collected and pumped to the TMF for reuse or treatment as described above. Observation wells sited between the Open Pit and the adjacent Big River will be used to monitor any interaction between Big River and the Open Pit and to periodically check groundwater quality. Details of the groundwater monitoring plan are provided in Appendix M of this document.

At the end of mining, the Open Pit will be allowed to fill with water, creating a man-made lake. This process is expected to take no more than five years. The Open Pit shoreline will be re-sloped to create a perimeter shallow-water wetland. Details of plans for reclamation and post-mining management of the Open Pit can be found in Appendices C and E, respectively.

Waste from ore processing will be in the form of tailings, which is a finely ground rock slurry containing the products of processing, and will be pumped to the TMF for permanent storage. Management of the process tailings is addressed in detail in Section 3.4.1.

Ore processing involves the use of various reagents, notably sodium cyanide for gold extraction and SMBS for the destruction of cyanide following the CIL circuit. These chemicals may pose a hazard to the immediate and surrounding environment if improperly used or as a result of an accident. The Spill Contingency Plan described in Section 8.2 addresses proper handling and procedures to be followed in the event of a spill.

8.0 EMERGENCY MANAGEMENT

The Mine is subject to O. Reg. 560/94 and therefore must follow the Ontario MOE Guideline for Implementing Spill Prevention and Contingency Plans Regulatory Requirements (O.Reg. 224/07) dated May 2007. The following subsections describe Contingency Plans developed for the Site.

8.1 Emergency Response

The Precious Metals Mine Emergency Response Plan focuses on the response to incidents involving fire and injury related to process reagents and other hazardous substances (i.e., fuels and blasting agents) used during Mine operations. General procedures for emergency management, response communication, and notification are detailed in the Emergency Response Plan. The Plan lists personnel responsibilities and available resources for emergency response in the event of an incident.

Specific actions for fire fighting and first aid related to incidents involving each of the process reagents used at the Site are provided, along with anticipated reagent inventories and Material Safety Data Sheets.

8.2 Spill Contingency

Similar to the Emergency Response Plan, the Spill Contingency Plan is based on the same general emergency response procedure, which is common to all aspects of emergency management throughout the Site.

Specifically, the Spill Contingency Plan addresses on-Site spills of hydrocarbons, tailings from pipelines, process reagents, and, in particular, sodium cyanide (reagent of primary concern). The Spill Contingency Plan also provides detailed information regarding the management of off-Site spills of sodium cyanide, which could potentially occur during transport to the Site. General procedures, responsibilities, chain-of-command, resources, and notifications are all defined within the Plan.

8.3 Tailing Management Facility Contingency

The TMF Contingency Plan reviews the general framework for emergency management at the TMF at the Mine. The plan describes criteria used to determine if an emergency ensues, as well as procedures to follow in the event of a declared emergency. In the event of a dam failure or overflow (i.e., due to elevated inflows), five (5) measures exist to manage and mitigate the impacts from such an event. These are:

1) Processing Plant shutdown
2) Discharge of tailings water to the Open Pit
3) Evacuation of affected or potentially affected areas

4) Containment of any uncontrolled release
5) Deployment of a siltation barrier to prevent downstream contamination by sediment monitoring

The TMF Contingency Plan reviews resources, responsibilities, and notification procedures. It should be recognized that the TMF Contingency Plan is focused on actions related to dam failure or overflow, while wastewater management contingencies are addressed in Section 8.5 of this document.

8.4 Groundwater Contingency Plan

The Groundwater Contingency Plan addresses responses to issues related to the interaction of groundwater between Big River and the Open Pit and seepage from the TMF.

The plan describes the operating circumstances of each situation and the monitoring provisions as detailed in the Groundwater Monitoring Plan. Mitigative actions are described for both the Open Pit and TMF. In the case of the Open Pit, these include a minimum 100 m setback of the Open Pit from Big River, drainage and dewatering provisions, and a generally low degree of hydraulic conductivity in the host rock. In the case of the TMF, these measures include: the clay core of the dam, the low permeability of the tailings, seepage collection structures, and similar hydrogeology to the Open Pit area.

In the Open Pit, increases in subsurface inflows or a sudden in-rush of water from historic mine working would be addressed through alerting operating crews, increasing monitoring frequency, and increasing pumping rates. At the TMF, a change in groundwater "chemical signature" or quantity could indicate seepage that may be addressed through increased pumping from collection ditches, increased monitoring, delineation drilling and grouting, reduction in free water in the Tailings Pond, or establishment of additional wells to create a hydraulic barrier.

Responsibilities, resources, reporting, and notification are all covered in the Groundwater Contingency Plan.

8.5 Wastewater Contingency

The two situations that require contingency response with respect to wastewater are excess wastewater quantity and inadequate wastewater quality. Excess quantity can occur anywhere throughout the system as a result of extreme inflows. Inadequate quality is only an issue in the Holding Pond where treated water does not meet requirements for discharge to the CW. Disaster scenarios in the form of a dam failure or overflow are dealt with in the TMF Contingency Plan provided in Appendix B.

8.5.1 Tailings/Water Reclaim Pond Capacity

When filled to design capacity with tailings, the Tailings Pond still has 220,000 m^3 of surge capacity available, sufficient to manage inflow from the 1/200-year storm. Additionally, since the dam is to be built up one year ahead of filling, the TMF will never have less than 1.4 million m^3 of excess capacity to manage extreme inflows, as presented on the design drawings attached separately. The Tailings Pond will have a minimum surge capacity equal to roughly seven times the inflow from the 1/200-year storm.

8.5.2 Polishing Pond Capacity

The Polishing Ponds have a (combined) design volume of 150,000 m^3. An additional 100,000 m^3 (67%) of surge capacity is available to manage fluctuations in inflow volumes. A further 150,000 m^3 of surge capacity has been designed to allow the Polishing Ponds to accept overflow from the Tailings Pond via the main spillway without a breach of containment during extreme conditions. The Polishing Ponds spillway would be activated at a volume in excess of 400,000 m^3 to prevent overtopping of the dams. This water would be discharged to the CW. The Polishing Ponds will be able to accommodate a maximum volume of 450,000 m^3.

The Polishing Ponds will be drained every winter (December through March). The timing will be such that when the spring thaw occurs, the Settling and Holding Ponds will be empty so that the entire 400,000 m^3 of containment capacity is available to accept overflow from the Tailings Pond in the event of extreme inflows.

8.5.3 Process Water Pond Capacity

Process water will be reclaimed to a 19,000 m^3 storage pond at the mill. This pond will act in a dual role to collect potentially contaminated runoff from the Processing Plant Site. The pond will normally operate at 50% of its capacity. If inflows due to extreme conditions raise the pond level to 70% of its capacity, reclaim from the TMF ceases and water withdrawal for processing will continue to lower the pond level. If the pond level continues to rise due to inflow, then withdrawal for processing will continue and excess water will be returned down the reclaim line to the TMF until the pond level is stabilized. Details regarding the operation of the Process Water Pond to manage extreme inflows is provided in Appendix E.

8.5.4 Holding Pond Water Quality

In the event of inadequate water quality in the Polishing Ponds, reclaim from the Reclaim Water Pond would cease and water from the Holding Pond would be recycled to the mill to the Process Water Pond, via the water reclaim structure, for processing until the quality issue has been resolved. The Holding Pond will have the capacity to handle 500 m^3/hr or 3.0 million m^3 a year, or greater than 15% more than the highest sustained inflow expected in a wet year.

8.5.5 Ammonia and Cyanide Winter Operation Contingency

Natural reduction processes for ammonia, and cyanide in the TMF will be suppressed in the winter months (January, February, and March). As ice builds up the natural degradation processes will become less effective, potentially affecting the concentration detected at the effluent outfall. As a result, there will be no effluent released between January, February, and March. Sufficient contingency volume has been designed in the TMF ponds to allow continuous operation of Mine operations without effluent release during this period. If there is minimal ice buildup during these months and testing indicates that concentrations are acceptable, some effluent may be released during these months.

8.5.6 Acid Buildup Contingency

In the event of acid buildup within the TMF, pH concentrations will be reduced using the existing lime mixing utilities of the ETP. Effluent from the ETP will be directed to the TMF zone requiring acid reduction. Lime will be mixed at a rate of up to 225 tpa.

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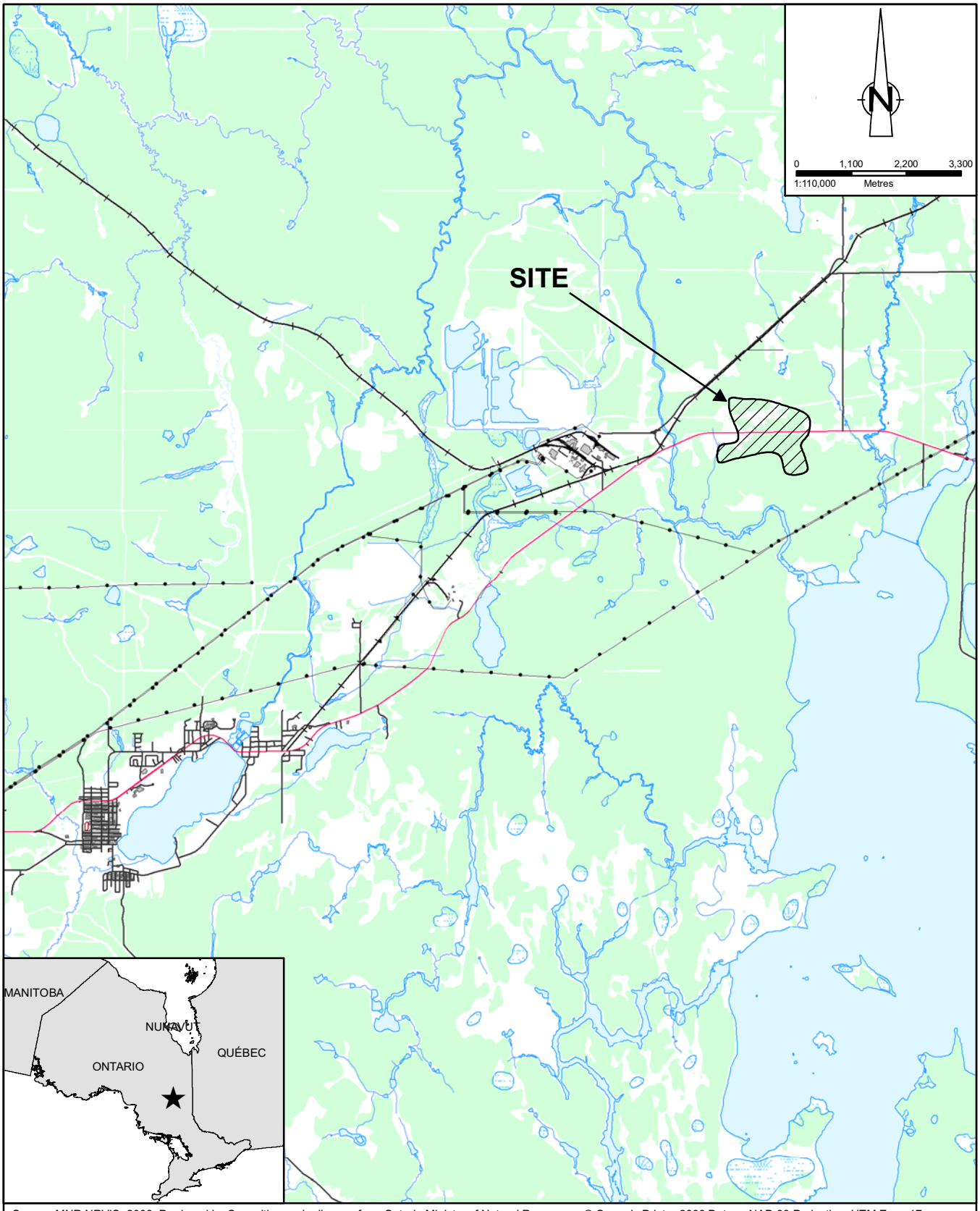
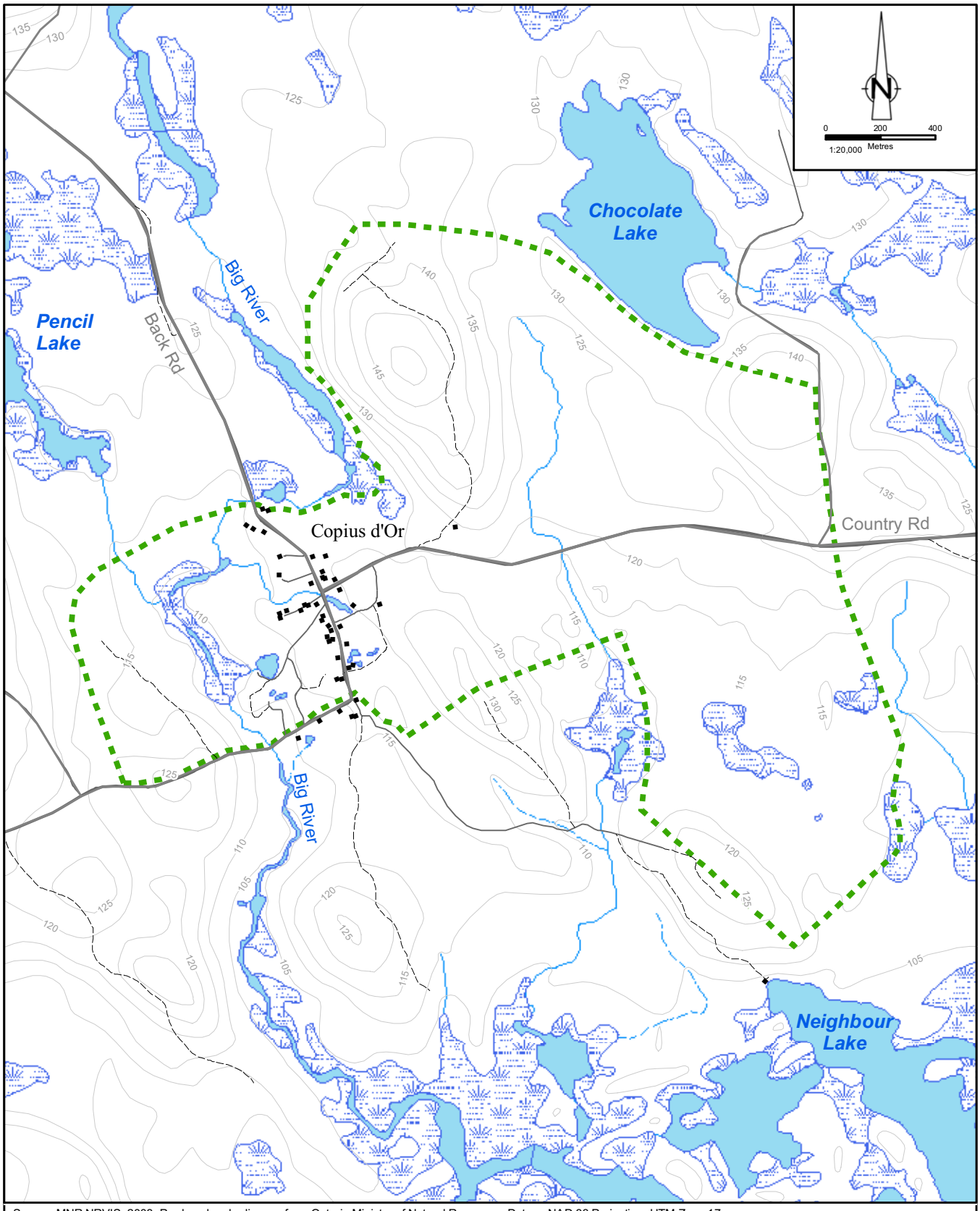


Source: MNR NRVIS, 2008. Produced by Consulting under licence from Ontario Ministry of Natural Resources, © Queen's Printer 2008 Datum: NAD 83 Projection: UTM Zone 17

figure 1.1

REGIONAL MAP
ACME MINERAL RIGHTS LLC
ACME MR PRECIOUS METALS MINE
Copious d'OR, Ontario



Source: MNR NRVIS, 2008. Produced under license from Ontario Ministry of Natural Resources Datum: NAD 83 Projection: UTM Zone 17

- Buildings
- Local Paved
- Seasonal
- Cart Track
- Trail
- Contours
- Project Site Boundary
- Wetlands; Bogs
- Lakes

figure 1.2
LOCATION MAP
ACME MINERAL RIGHTS LLC
ACME MR PRECIOUS METALS
Copious d'Or, Ontario

053469(REP011)GIS-DA001.2 September 22, 2009

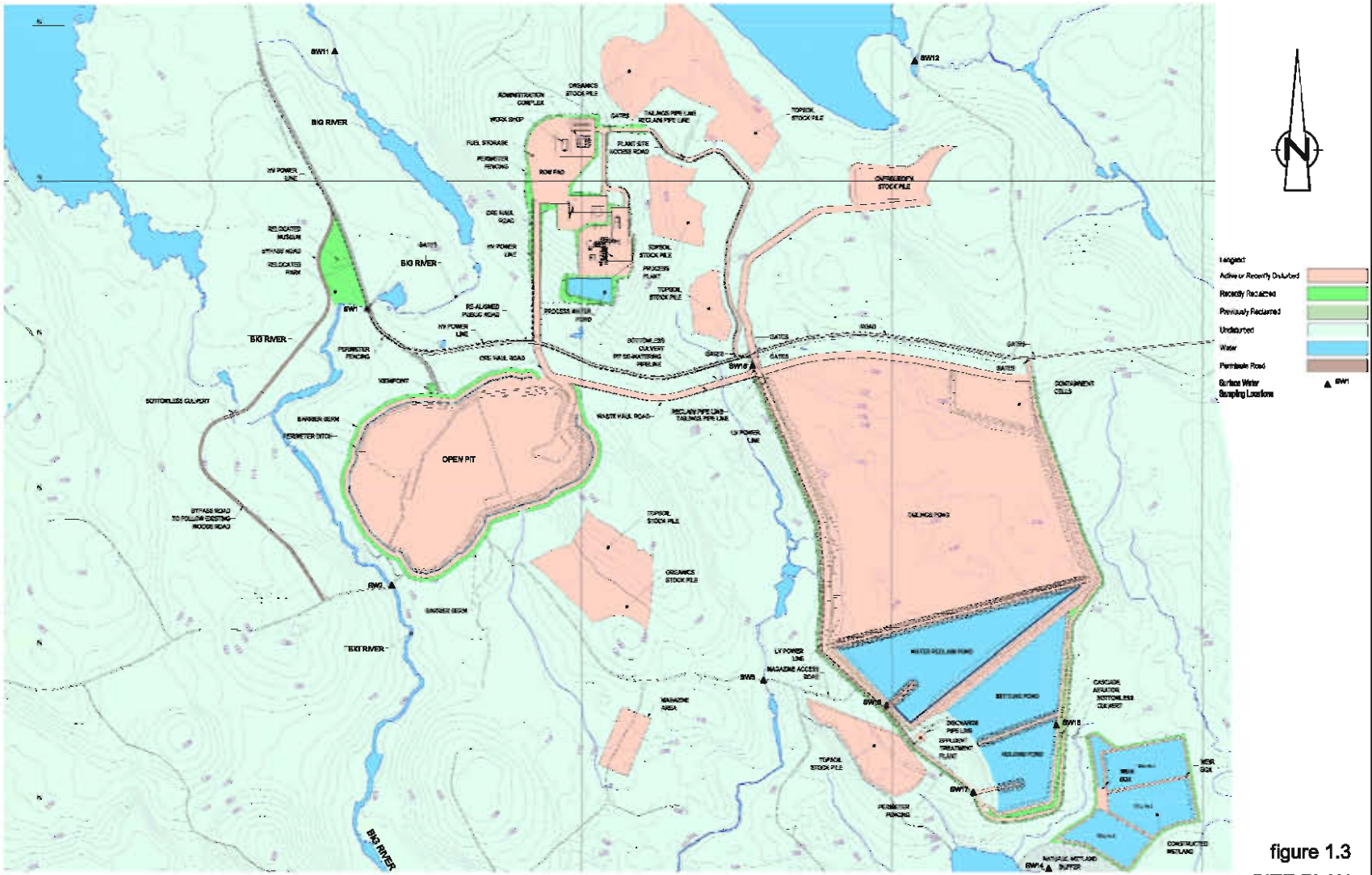


figure 1.3

SITE PLAN
ACME MINERAL RIGHTS LLC
ACME MR PRECIOUS METALS MINE
Copious d'OR, Ontario

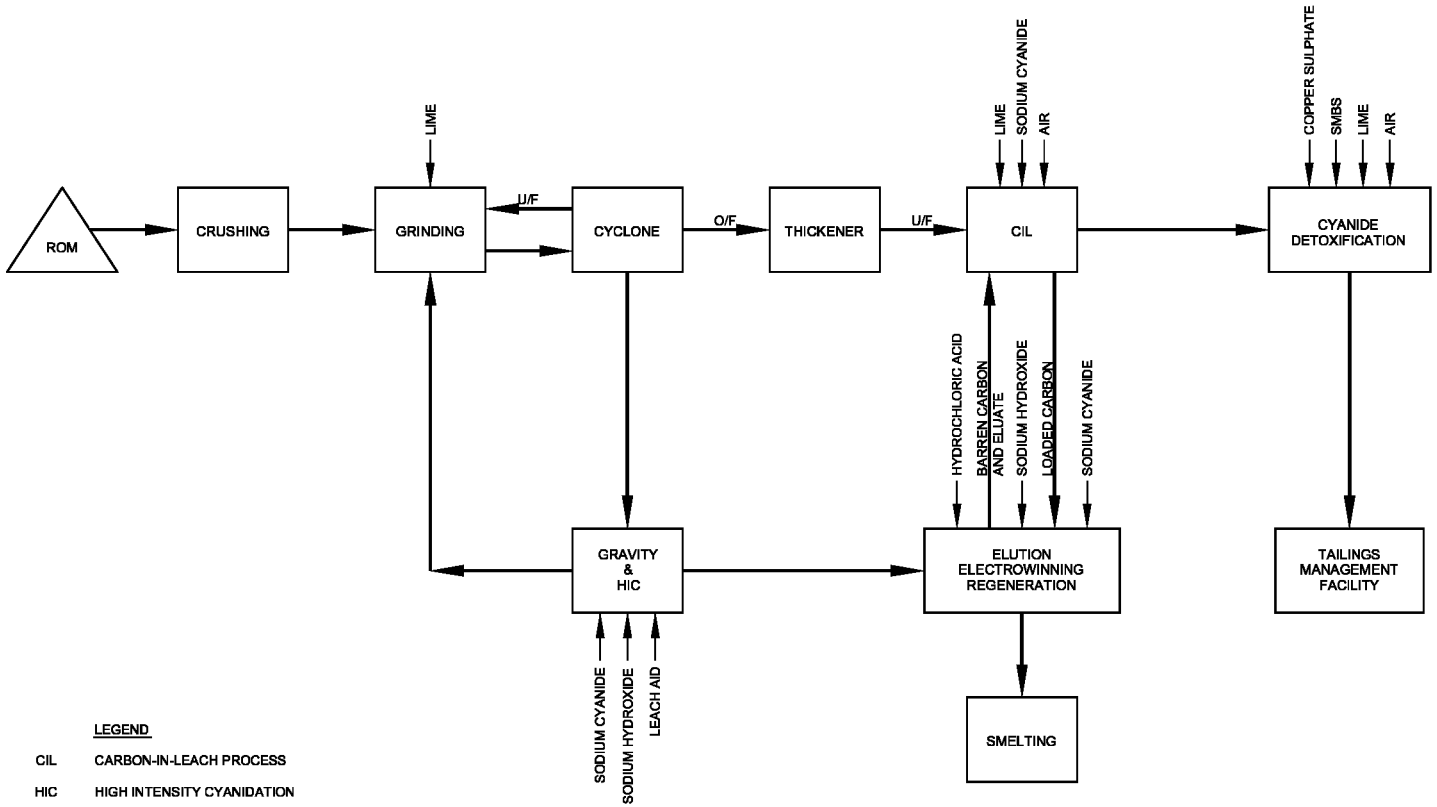


figure 2.1

ORE PROCESSING FLOW DIAGRAM
ACME MINERAL RIGHTS LLC
ACME MR PRECIOUS METALS MINE
Copious d'OR, Ontario

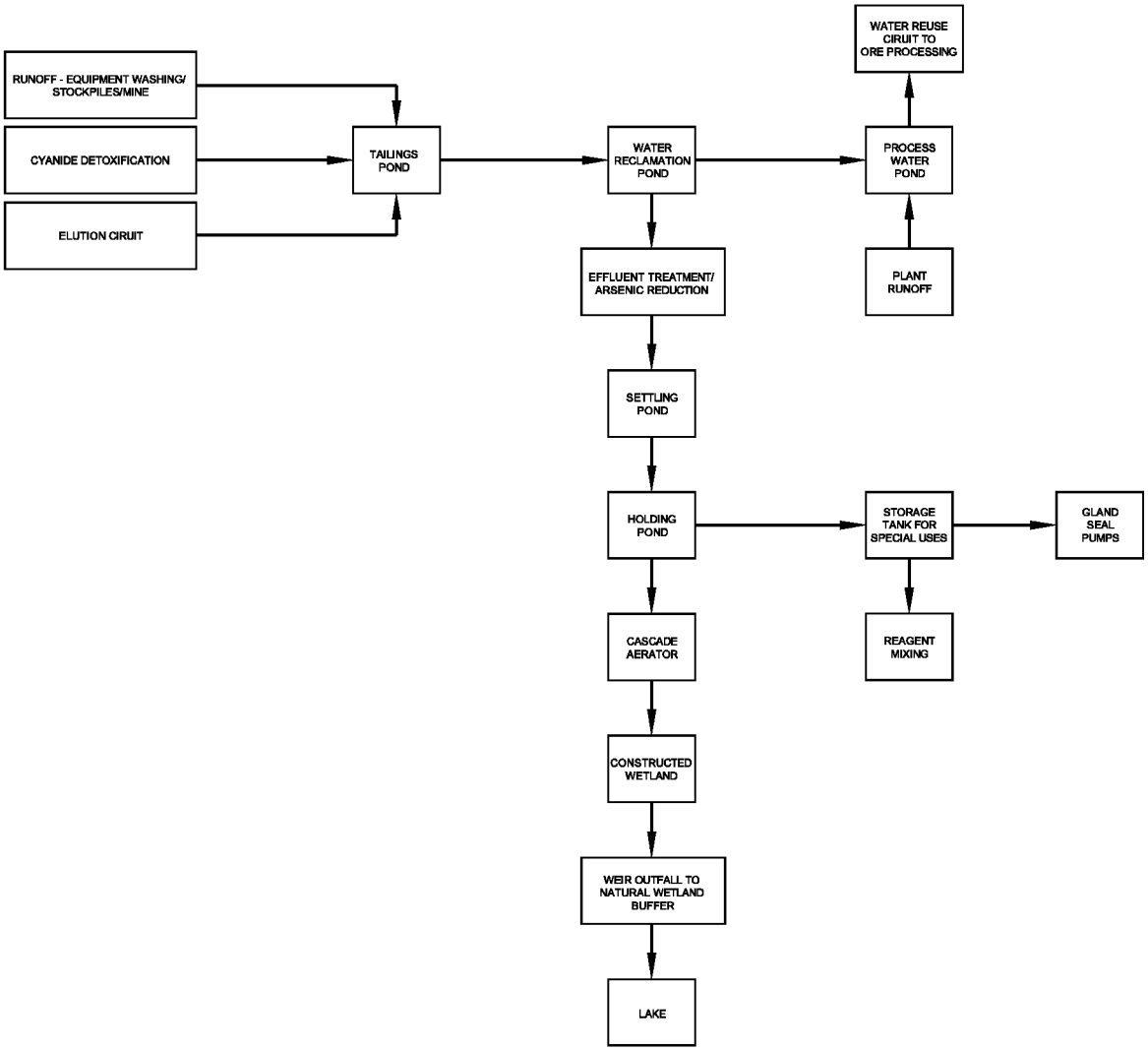


figure 3.1

TAILINGS MANAGEMENT FACILITY PROCESS FLOW DIAGRAM
ACME MININERAL RIGHTS LLC
ACME MR PRECIOUS METALS MINE
Copious D'OR, Ontario

APPENDIX A

STORMWATER MANAGEMENT PLAN

STORMWATER MANAGEMENT PLAN

Precious Metals Mine
Copious d'Or, Ontario

Prepared for:
ACME Mineral Rights LLC
123 Easy St.
Copious d'Or, Ontario
C3B 2A1

Prepared by:
Consulting Ltd.
123 Office Drive
Someplace, Ontario
A1B 2C3

January 21, 2009

APPENDIX B

TAILINGS MANAGEMENT FACILITY DESIGN

ACME MR PRECIOUS METALS MINE
Project No.: 053469-20

DESIGN CALCULATIONS – TAILINGS MANAGEMENT FACILITY

Date: December 20, 2008

Designed by: Junior Engineer

Checked by: Jo Consultant

1.0 PUMP STATION DESIGN

1.1 Design Basis

The water needs for the processing plant is 216 m^3/hr (60 L/s) continuously throughout the year. This water is supplied from the Water Reclamation Pond located within the TMF. The pump station is required to convey the design flow via a forcemain along the proposed trajectory as shown on the attached drawings (approximately 4,000 metres in length). The processing plant area consists of a storage pond with 19,000 m^3 capacity. Therefore, the pump station does not require redundancy, as there is adequate reserve to facilitate any repairs that may be required should any disruptions occur in the delivery of the design flow to the processing plant.

The average water level in the wet well at the pump station will be approximately 120 m, with an anticipated minimum elevation of 118 m and a maximum of 123.5 m. At the discharge point into the storage pond at the processing plant, the discharge elevation is 134 m. The forecmain material was selected to be HDPE to minimize any potential leakage, and to provide a relatively flexible material for ease of construction.

1.2 Hydraulic Design Calculations

Section 7.2.3 of the Design Guidelines for Sewage Works recommends that the design of pumping stations be based on system head calculations and curves for three conditions using the appropriate Hazen-Williams factor "C" as follows:

- Low sewage level in the wet well, C = 120
- Median sewage level over the normal operating range in the wet well, C = 130
- Overflow sewage level in the wet well, C = 140

Detailed hydraulic calculations were performed for each of these conditions during the design of the Water Reclaim Pond pumping station to determine appropriate pump sizing and verify forcemain design. These calculations may be found attached.

1.3 Design Summary

Table 1 summarizes the results of system head calculations as described above.

TABLE 1: WATER RECLAIM POND PS – DESIGN CALCULATION SUMMARY

Parameter	C = 120	C = 130	C = 140
Pump Design Flow (L/s)	60	60	60
Forcemain Head Loss (m)	36.4	31.3	27.3

Suction Line Head Loss (m)	0.5	0.5	0.5
Discharge Line Head Loss (m)	0.5	0.5	0.5
Total Head Loss (m)	37.4	32.3	28.3
Low Wet Well Water Level (m)	118	118	118
Median Wet Well Water Level (m)	120	120	120
High Wet Well Water Level (m)	123.5	123.5	123.5
Forcemain End Elevation (m)	134	134	134
Maximum Static Head (m)	16	16	16
Minimum Static Head (m)	10.5	10.5	10.5
Maximum Total Dynamic Head (m)	53.4	48.3	44.3
Minimum Total Dynamic Head (m)	47.9	42.8	38.8

As per the Design Guidelines for Sewage Works, the median system-head curve (C = 130) was used to select the pump and motor, since this condition best reflects normal operating conditions. Table 2 lists characteristics of the selected pump and proposed piping installation.

TABLE 2: WATER RECLAIM POND PS UPGRADE – DESIGN SUMMARY

Parameter	Value
Pump Capacity (L/s)	60
Pump Suction Opening (mm)	250
Pump Discharge Opening (mm)	200
Impeller Diameter (mm)	416
Large Solids Capacity (mm)	50
Power (hp)	85
Pump Speed (rpm)	1775
Forcemain Velocity (m/s)	1.3

The pipe data form associated with this pump station is included in the main Technical Design Brief document.

1.4 Emergency Backup Power

The Design Guidelines for Sewage Works recommends that emergency pumping capability be accomplished by the provision of portable or in-place internal combustion equipment, or by the provision of portable pumping equipment.

The Water Reclaim Pond PS is currently equipped with a transfer switch and exterior receptacle to provide emergency backup power from a portable generator in the event of a power failure. The pump station has sufficient wastewater storage capacity and an alarm system to allow time for detection of pump station failure and transportation and connection of the generating equipment.

The generating equipment has sufficient capacity to start up and maintain the new design capacity of the station. The system is also adequate to provide power for essential lighting and ventilation.

APPENDIX C

EROSION AND SEDIMENT CONTROL PLAN

EROSION AND SEDIMENT CONTROL PLAN

PRECIOUS METALS MINE
COPIOUS D'OR, ONTARIO

Prepared for:
ACME Mineral Rights LLC
123 Easy St.
Copious d'Or, Ontario
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Prepared by:
Consulting Ltd.
123 Office Drive
Someplace, Ontario
A1B 2C3

January 21, 2009

APPENDIX D

SITE PLANS FOR TMF DEVELOPMENT

ACME MR PRECIOUS METALS MINE
Project No.: 053469-20

SITE PLANS FOR TMF DEVELOPMENT

Date: January 20, 2009

Designed by: Junior Engineer

Checked by: Jo Consultant

APPENDIX E

PROCESS WATER AND DESIGN

ACME MR PRECIOUS METALS MINE
Project No.: 053469-20

DESIGN CALCULATIONS – PROCESS WATER

Date: January 20, 2009

Designed by: Junior Engineer

Checked by: Jo Consultant

APPENDIX F

CYANIDE DESTRUCTION BRIEF

ACME MR PRECIOUS METALS MINE
Project No.: 053469-20

CYANIDE DESTRUCTION BRIEF

Date: January 10, 2009

Designed by: Junior Engineer

Checked by: Jo Consultant

APPENDIX G

SOLUBLE COPPER MANAGEMENT PLAN

SOLUBLE COPPER MANAGEMENT PLAN

PRECIOUS METALS MINE
COPIOUS D'OR, ONTARIO

Prepared for:
ACME Mineral Rights LLC
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Consulting Ltd.
123 Office Drive
Someplace, Ontario
A1B 2C3

January 21, 2009

CONSULTING LTD.

APPENDIX H

EFFLUENT TREATMENT PLANT DESIGN

ACME MR PRECIOUS METALS MINE
Project No.: 053469-20

DESIGN CALCULATIONS – EFFLUENT TREATMENT PLANT

Date: February 10, 2009

Designed by: Junior Engineer

Checked by: Jo Consultant

APPENDIX I

CONTAINMENT CELL DESIGN

ACME MR PRECIOUS METALS MINE
Project No.: 053469-20

DESIGN CALCULATIONS – CONTAINMENT CELL

Date: February 22, 2009

Designed by: Junior Engineer

Checked by: Jo Consultant

APPENDIX J

CONSTRUCTED WETLAND DESIGN

ACME MR PRECIOUS METALS MINE
Project No.: 053469-20

DESIGN CALCULATIONS – CONSTRUCTED WETLAND

Date: February 22, 2009

Designed by: Junior Engineer

Checked by: Jo Consultant

APPENDIX K

SURFACE WATER MONITORING PLAN

SURFACE WATER MONITORING PLAN

PRECIOUS METALS MINE
COPIOUS D'OR, ONTARIO

Prepared for:
ACME Mineral Rights LLC
123 Easy St.
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Prepared by:
Consulting Ltd.
123 Office Drive
Someplace, Ontario
A1B 2C3

January 21, 2009

APPENDIX L

ASSIMILATIVE CAPACITY ANALYSIS REPORT

TECHNICAL MEMORANDUM
ASSIMILATIVE CAPACITY STUDY OF NEIGHBOUR LAKE

PRECIOUS METALS MINE
COPIOUS D'OR, ONTARIO

Prepared for:
ACME Mineral Rights LLC
123 Easy St.
Copious d'Or, Ontario
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Prepared by:
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123 Office Drive
Someplace, Ontario
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AUGUST, 2009

CONSULTING LTD.

TABLE OF CONTENTS

EXECUTIVE SUMMARY

This desktop analysis of the assimilative capacity of Neighbour Lake was undertaken by Consulting Ltd. to determine appropriate effluent limits for the proposed Precious Metals Mine (Mine), which discharges treated effluent water to Neighbour Lake. The effluent water discharges from a constructed wetland (CW) system to the northeast edge of Neighbour Lake through a 100 m wide natural wetland buffer that separates the shoreline of Neighbour Lake from the CW.

The Mine, which is owned and operated by ACME Mineral RightsLLC (ACME MR), is a conventional gold mining facility with a sewage works effluent annual average discharge of 2.5 million cubic meters (m^3) and a maximum daily discharge of 12,000 m^3 per day. This assimilative capacity study assesses the effluent discharge and defines the impact of this change on the receiving water body for the proposed operation duration of the Mine. This assessment of Neighbour Lake is based on the calculated 7Q20 stream flow analysis and maximum contaminant loadings to predict water quality within the mixing zone. Background water quality used in this analysis is based on the 75^{th} percentile concentrations.

There does not appear to be a negative impact on white suckers, white perch, brook trout, American eel, lake chub and gaspereau habitat or passage from proposed discharges to Neighbour Lake.

Effluent design objectives relate to the design condition and performance objectives for the operation of the treatment facilities. Processes are designed and operated to achieve better effluent than the existing compliance criteria. Effluent compliance criteria are the legally enforceable concentrations required under the regulatory environmental legislation.

Based on the review of available data (including evaluation of background water quality, sediment quality, and aquatic communities) completed for this study and input from the MOE (consultation meeting held June 12, 2008), it is recommended that ACME MR implement a long-term monitoring program, for the Precious Metals Mine, of selected water quality parameters in Neighbour Lake to improve understanding of the local impact of wastewater treatment plant discharges prior to and after increasing the elevation of proposed dam and dyke crests. In particular, it would be beneficial to determine total cyanide and weak acid dissociable (WAD) cyanide, copper, nickel, sodium-sulfate, total suspended solids, total ammonia nitrogen concentrations, vertical temperature, dissolved oxygen concentration profiles and pH at selected locations in Neighbour Lake under summer/fall (i.e. July to September) conditions. As a minimum, sampling locations for Neighbour Lake should include the current shoreline in the vicinity of the current Natural Wetland Buffer (the proposed outflow location).

The Effluent Limits and Objectives proposed for this project are as follows:

Effluent Parameter	***Daily Concentration Limits (mg/L)***	***Daily Concentration Objectives (mg/L)***
Total Cyanide	0.4	0.3
Weak Acid Dissociable (WAD) Cyanide	0.2	0.2
Copper	0.4	0.3
Nickel	0.5	0.4
Total Suspended Solids	15	15
Total Ammonia Nitrogen	10	8
pH of the effluent maintained between 6.0 to 9.5, inclusive, at all times		

APPENDIX M

GROUNDWATER MONITORING PLAN

GROUNDWATER MONITORING PLAN

PRECIOUS METALS MINE
COPIOUS D'OR, ONTARIO

Prepared for:
ACME Mineral Rights LLC
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Prepared by:
Consulting Ltd.
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Someplace, Ontario
A1B 2C3

January 21, 2009

APPENDIX N

GEOTECHNICAL ANALYSIS AND DAM STABILITY REPORT

SoilTECH

GEOTECHNICAL INVESTIGATION

Precious Metals Mine

Copious d'Or, Ontario

Submitted to: Consulting Ltd.

Date: August 8, 2008

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF APPENDICES

EXECUTIVE SUMMARY

The Precious Metals Mine (Mine) Project owned by ACME Mineral Rights LLC (ACME MR) involves the construction and operation of an open pit gold mine that includes an ore processing plant and associated Tailings Management Facility (TMF). The Mine is located at 12345 Concession 7, near the town of Copious d'Or, in North Nugget County, Ontario (Site). The property is approximately 265 hectares.

The project description indicates that gold will be removed from the ore in a process involving two stages: gravity concentration and carbon-in-leach (CIL) procedure. The detoxification process is proposed to be a sulphur dioxide (SO_2)/Air procedure prior to process discharges into the TMF as slurry (with approximately 50% solids).

This Geotechnical Analysis Report (Report) documents the results of the geotechnical investigation conducted by SoilTECH Inc. (SoilTECH) at the Site and provides recommendations regarding subsurface conditions and the design and construction of all dams, dykes, foundations for structures, containment cell caps, and all other geotechnical features of the TMF. In general the components of the TMF includes the following:

- Tailings Pond
- Water Reclaim Pond
- Settling Pond
- Holding Pond
- Effluent Treatment Plant (ETP)
- Containment Cells
- Constructed Wetland (CW)

The scope of work for the geotechnical investigation included excavation of sixteen (16) test pits and drilling eleven (11) boreholes to depths below existing grades to confirm subsurface conditions within the proposed area of development of the TMF. The borings were advanced using a continuous flight power auger machine using hollow stem augers. The detailed results of the individual test pits and boreholes are summarized in this Report and recorded on the test pit logs and borehole logs, which are appended to this Report. Groundwater observations were made in the boreholes during and upon completion of drilling. Geotechnical laboratory testing included moisture content, grain size distribution, bulk density, bearing capacity, permeability,

and other parameters. Results from all testing activities are included in this report.

The Site is suitable for conventional, zoned, water retaining embankment dams with central water retaining cores founded on stiff clay or grouted bedrock. This is a proven method for embankment dam construction at mines across Canada. The primary construction materials for construction of the dams will be rockfill and clay till sourced locally from the open pit and surrounding areas.

Stability and seepage analysis were conducted for the dams and is included in this Report. An instrumentation and monitoring program is proposed to ensure that the facility is functioning as designed and to assist operations staff.

The report also includes recommendations for permanent cover of the tailings management facility upon closure as well as the cover of the containment cell.

This report is intended solely for ACME MR. The material in it reflects our best judgment in light of the information available to SoilTECH at the time of preparation. No portion of this Report may be used as a separate entity, it is intended to be read in its entirety. Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties.

The recommendations made in this Report are in accordance with SoilTECH's present understanding of the project. It is also emphasized that a soil investigation, is, in fact, a random sampling of a Site and the comments are based on the results obtained at the test locations only. It is, therefore, assumed that these results are representative of the subsoil conditions across the Site. Should any conditions at the Site be encountered which differ from those found at the test locations, we request that we be notified immediately in order to permit a reassessment of our recommendations.

Attachment 6:

Engineering Design Drawings and Specifications (Attached separately)

KEY MAP

LOCATION PLAN

PRECIOUS METALS MINE PROJECT

CITY OF COPIOUS D'OR
AUGUST 2009

City of Copious D'or

ACME Mineral Rights LLC

CONSULTING LTD.

DRAWING INDEX

METRIC

SHEET No	DRAWING NUMBER	DESCRIPTION
		GENERAL
1	C-01	COVER SHEET
2	C-02	DRAWING INDEX
3	C-03	GENERAL ABBREVIATIONS
		CIVIL
4	C-01	EXISTING SITE CONDITIONS
5	C-02	SITE LAYOUT PLAN - 2009
6	C-03	SITE LAYOUT PLAN - 2009
7	C-04	SITE LAYOUT PLAN - 2010
8	C-05	SITE LAYOUT PLAN - 2011
9	C-06	SITE LAYOUT PLAN - 2012
10	C-07	SITE LAYOUT PLAN - 2013
11	C-08	SITE LAYOUT PLAN - 2014
12	C-09	SITE LAYOUT PLAN - 2015 C+1
13	C-10	SITE LAYOUT PLAN - 2017 C+3
14	C-11	SITE LAYOUT PLAN - 2019 C+5
15	C-12	STORMWATER MANAGEMENT PLAN
16	C-13	EROSION AND SEDIMENT CONTROL PLAN
17	C-14	TAILINGS MANAGEMENT FACILITY PLAN
18	C-15	PROCESS PLANT AREA PLAN
19	C-16	DRAINAGE AND PIPING PLAN
20	C-17	SITE ROADWAYS AND DETAILS
21	C-18	WASTE ROCK STOCKPILE - TYPICAL DESIGN
22	C-19	STORMWATER MANAGEMENT DETAILS - SHEET 1
23	C-20	STORMWATER MANAGEMENT DETAILS - SHEET 2
24	C-21	TAILINGS MANAGEMENT FACILITY - SECTIONS SHEET 1
25	C-22	TAILINGS MANAGEMENT FACILITY - SECTIONS SHEET 2
26	C-23	TAILINGS MANAGEMENT FACILITY - SECTIONS SHEET 3
27	C-24	TAILINGS MANAGEMENT FACILITY - SECTIONS SHEET 4
28	C-25	TAILINGS MANAGEMENT FACILITY - SECTIONS SHEET 5
29	C-26	SECTIONS AND DETAILS - SHEET 1
30	C-27	SECTIONS AND DETAILS - SHEET 2
31	C-28	SECTIONS AND DETAILS - SHEET 3
32	C-29	SECTIONS AND DETAILS - SHEET 4
33	C-30	SECTIONS AND DETAILS - SHEET 5
		PROCESS
34	P-01	OVERALL PLANT PROCESS DIAGRAM
35	P-02	FLOW DIAGRAM - EFFLUENT TREATMENT
36	P-03	FLOW DIAGRAM - CARBON-IN-LEACH PROCESS
37	P-04	CYANIDE DETOXIFICATION AND TAILINGS DISPOSAL AREA PROCESS FLOW DIAGRAM

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APPROVED

No.	DATE	REMARKS	BY

CITY OF COPIOUS D'OR

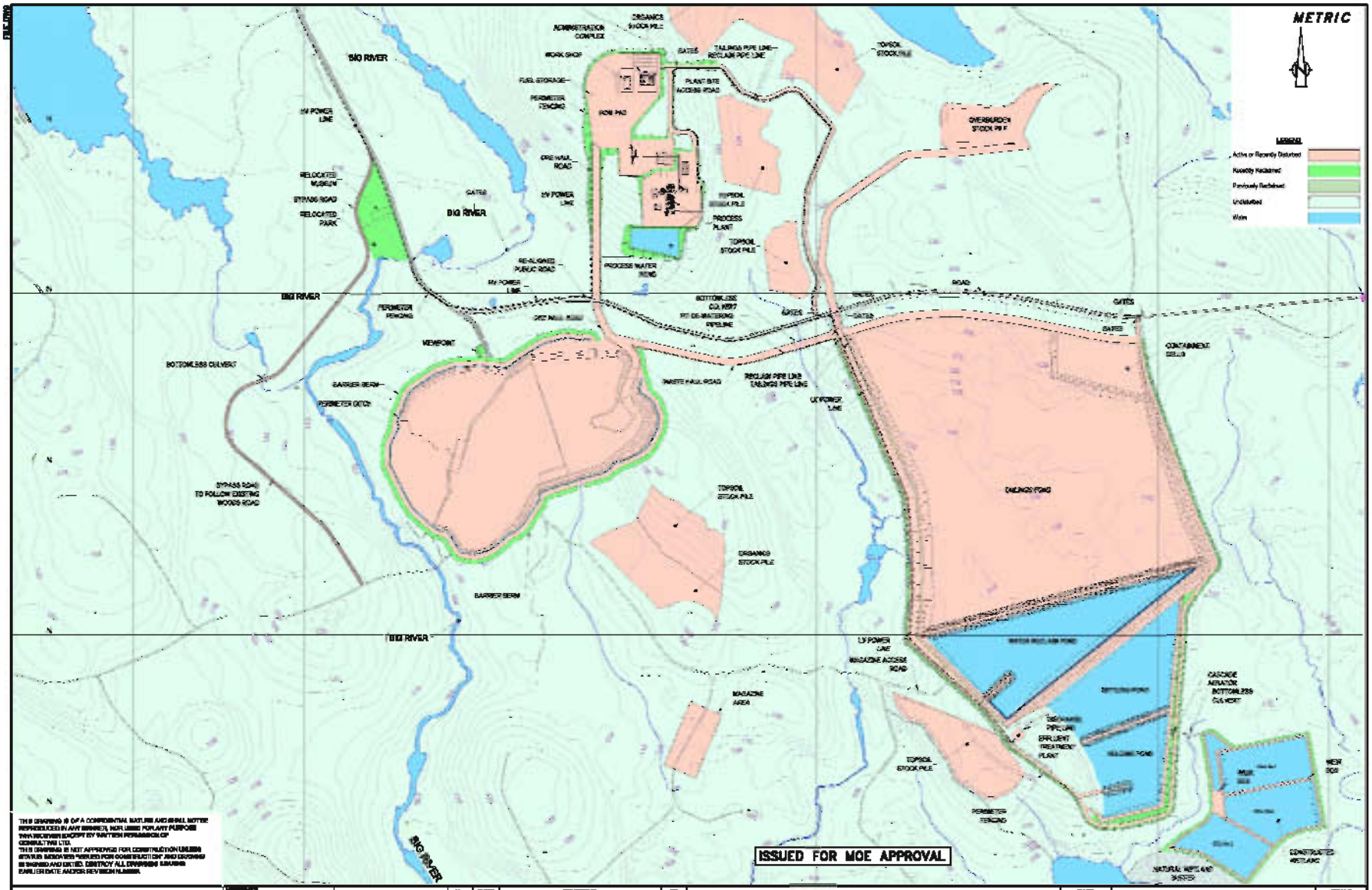
ACME MINERAL RIGHTS LLC.

DATE AUG 2009
DESIGN AS
DRAWN DS
CHECKED JC

PRECIOUS METALS MINE PROJECT

DRAWING INDEX

SCALE NTS
DWG. NO. C-02
CONT. NO. A-01-09
SHEET No. 2



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DESIGN AB
DRAWN DB
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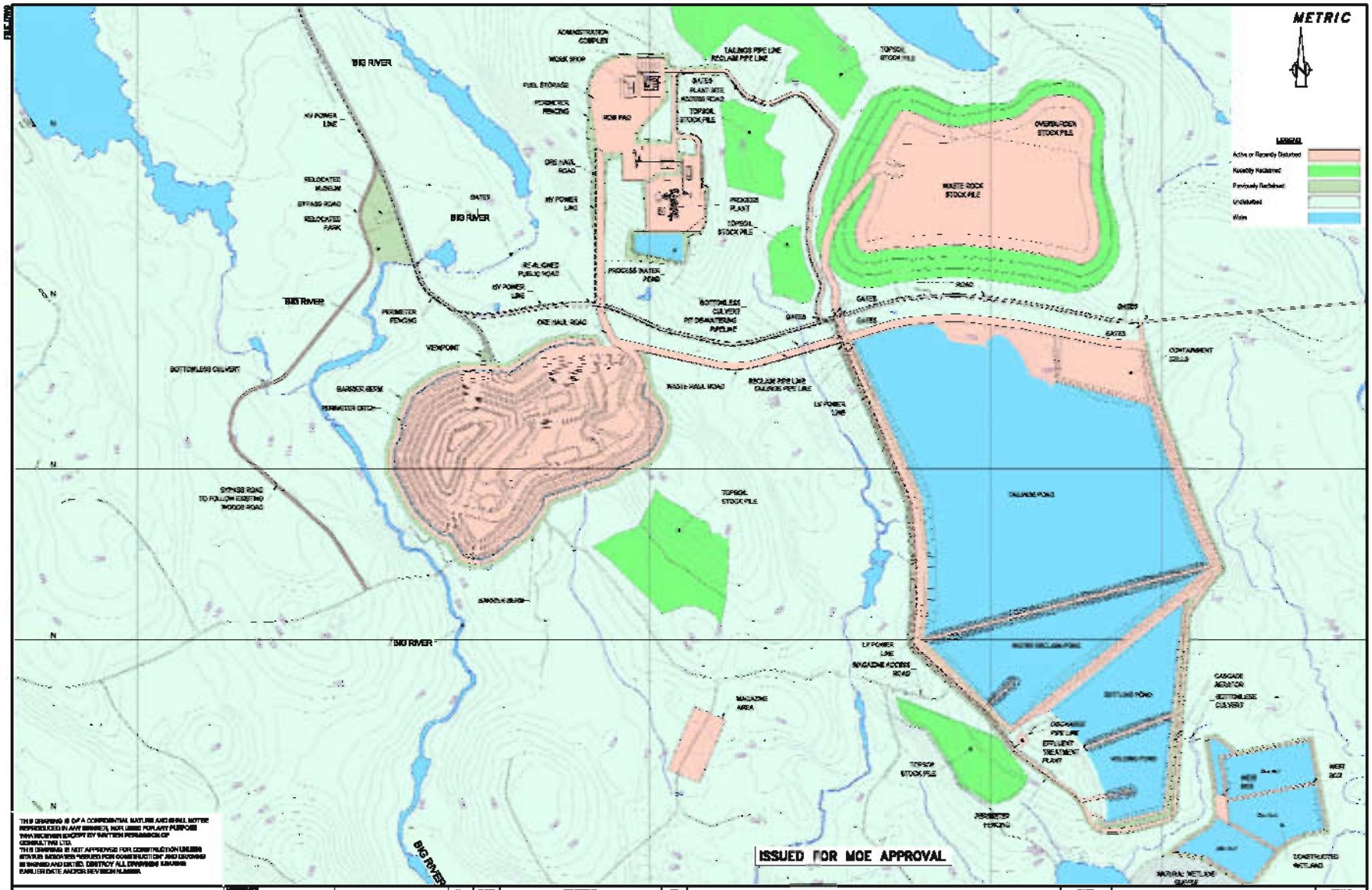
PRECIOUS METALS MINE PROJECT

SITE LAYOUT PLAN
YEAR 2009

SCALE NTS
DWG. NO. C-02
ORIG. SCL A-01-08
SHEET NO. –


METRIC
LEGEND
Active or Recently Disturbed
Recently Reclaimed
Previously Reclaimed
Undisturbed
Water
BIG RIVER
ADMINISTRATION COMPLEX
MESS SHOP
FUEL STORAGE
PERIMETER FENCING
MILL PAD
TAILINGS PIPE LINE RECLAIM PIPE LINE
WATER PLANT SITE ACCESS ROAD
TOPSOIL STOCK PILE
OVERBURDEN STOCK PILE
WASTE ROCK STOCK PILE
ORE HAUL ROAD
69 KV POWER LINE
RELOCATED MUSEUM
BYPASS ROAD
RELOCATED PARK
GATES
PROCESS PLANT
PROCESS WATER POND
RECLAIMED PUBLIC ROAD
BOTTOMLESS CULVERT
PIT DEWATERING PIPELINE
ROAD
CONTAINMENT CELLS
VIEWPOINT
WASTE HAUL ROAD
RECLAIM PIPE LINE TAILINGS PIPE LINE
BARRIER BERM
PERIMETER DITCH
SYNSEE ROAD TO FOLLOW EXISTING MOOSE ROAD
TAILINGS POND
MAGAZINE ACCESS ROAD
MAGAZINE AREA
CASCADE AERATOR
SETTLING POND
DISCHARGE PIPE LINE
EFFLUENT TREATMENT PLANT
CONSTRUCTED WETLAND
NATURAL WETLAND
ISSUED FOR MOE APPROVAL
CONSULTING LTD.
CITY OF COPIOUS D'OR
ACME MINERAL RIGHTS LLC.
PRECIOUS METALS MINE PROJECT
SITE LAYOUT PLAN
YEAR 2014

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No.	DATE	REMARKS	BY

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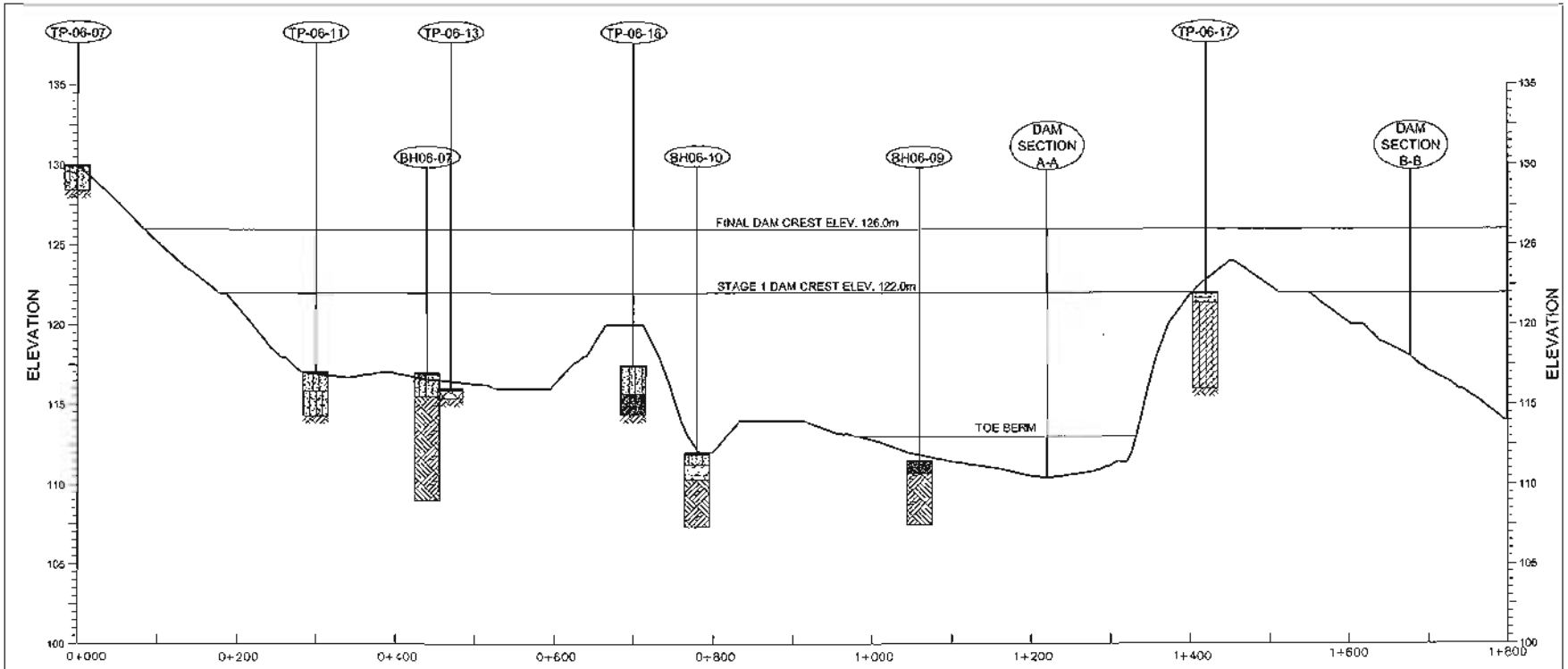
DESIGN AB
DRAWN DB
CHECKED JC

PRECIOUS METALS MINE PROJECT

SITE LAYOUT PLAN
YEAR 2019

SCALE NTS
DWG. NO. C-11
CONT. NO. A-01-98
SHEET NO. –

METRIC



STATION: 0+000 TO 1+800

LEGEND:

TP-06-07 TEST PIT LOCATION

BH06-07 BOREHOLE LOCATION

STATIGRAPGHY LEGEND:

- ORGANICS/TOPSOIL/PEAT
- SAND GRAVEL TO SANDY GRAVEL
- SILTY SAND TO SANDY SILT
- SILT
- SILTY CLAY TO CLAYEY SILT
- SILTY GRAVEL TO GRAVEL
- COBBLES AND BOULDERS
- BEDROCK

HORIZONTAL SCALE
100 0 100 200
SCALE HORIZ 1:5000 METRES

VERTICAL SCALE
5 0 5 10
SCALE VERT 1:250 METRES

NOTES:
1. FOR LOCATION OF SECTION REFER TO FIGURE 2.
2. ALL ELEVATIONS HAVE BEEN DERIVED FROM THE DIGITAL TOPOGRAPHIC MAP.
3. VERTICAL EXAGGERATION IS 20 to 1

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ACME MINERAL RIGHTS LLC.

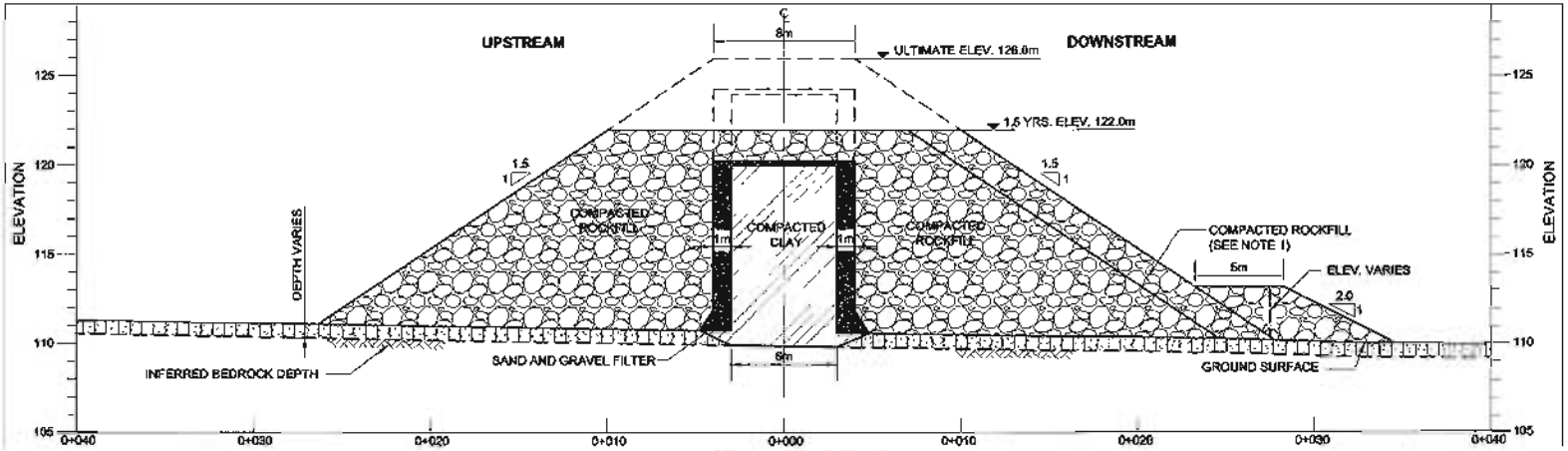
DATE AUG 2006
DESIGN AS
DRAWN CH
CHECKED JC

PRECIOUS METAL MINE PROJECT

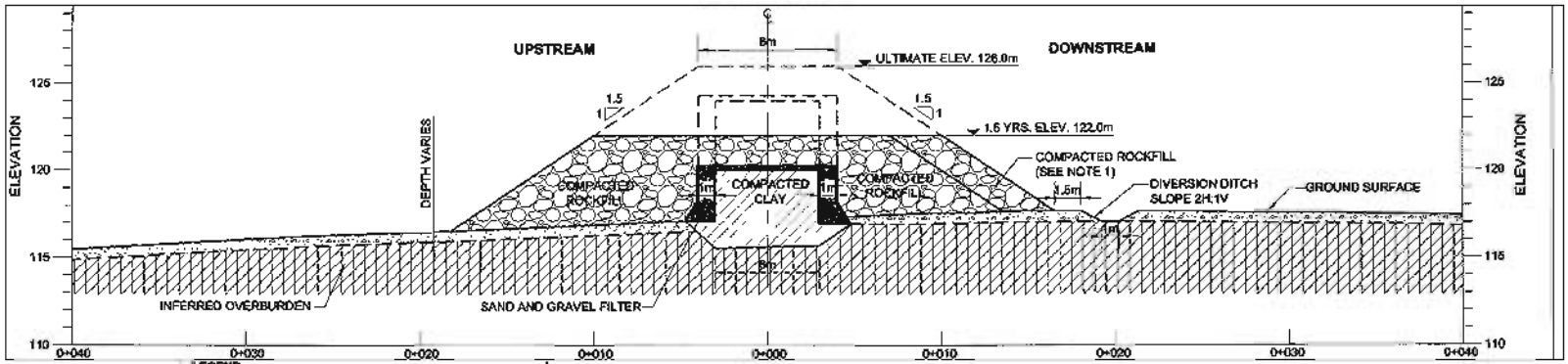
TAILINGS MANAGEMENT FACILITY SECTIONS SHEET 6

SCALE NTS
DWG. NO. C-35
CONT. NO. A-01-06
SHEET NO. SHEET No.

METRIC



DAM SECTION A-A



DAM SECTION B-B

LEGEND:

- COMPACTED ROCK FILL
- COMPACTED CLAY FILL
- SAND & GRAVEL FILTER
- SILTY SAND OVERBURDEN
- SAND & GRAVEL OVERBURDEN
- SILTY CLAY TO CLAYEY SILT OVERBURDEN

NOTES:

1. THIS SECTION IS OPTIONAL FOR THE 1.5 YEAR STAGE CONSTRUCTION AND CAN BE CONSTRUCTED AT A LATER STAGE.

5 0 5 10
SCALE 1:250 METRES

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No.	DATE	REMARKS	BY

CITY OF COPIOUS D'OR

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DATE AUG 2000
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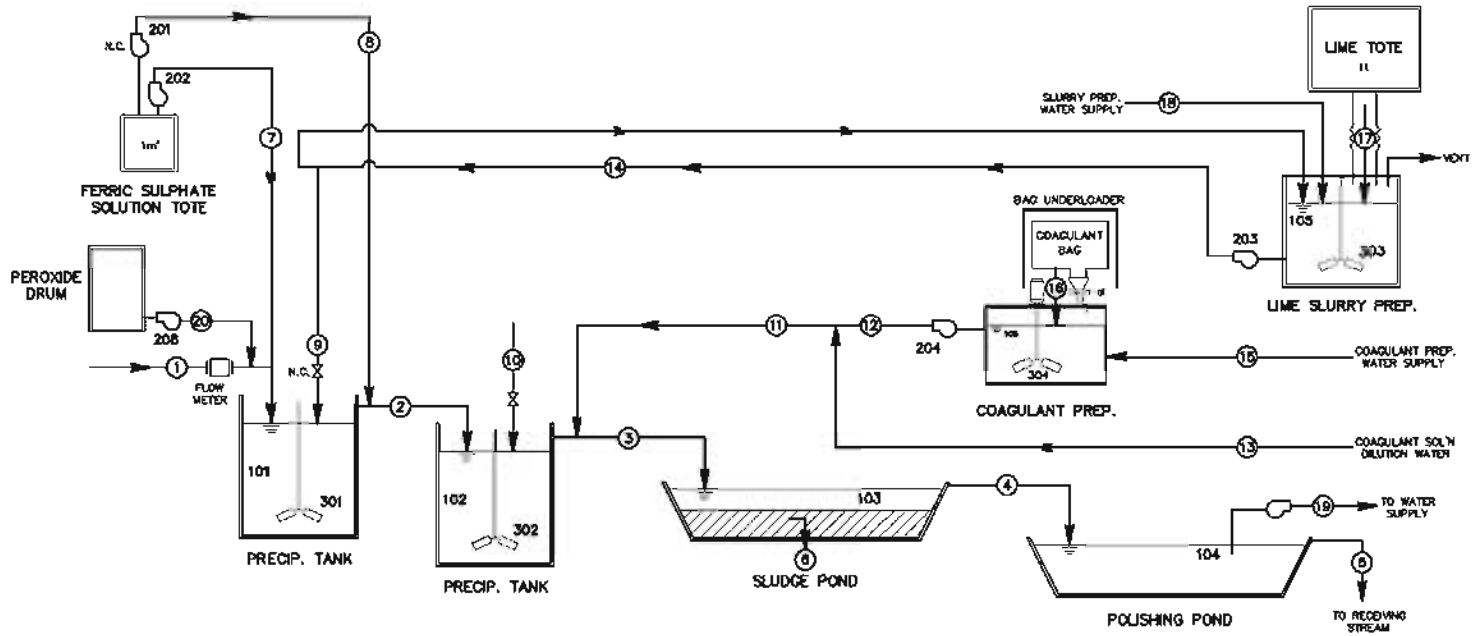
PRECIOUS METAL MINE PROJECT

SECTIONS AND DETAILS
SHEET 5

SCALE NTS
DWG. NO. C-20
ORIG. SIZ. A-01-96
SHEET No. SHEET No.

METRIC



	1	2	3	4	5	6	7	8	9	10
LINE	TAILINGS EFFLUENT	STAGE I PRECIPITATION	STAGE II PRECIPITATION	CLARIFIED WATER	FINAL EFFLUENT	SETTLED SLUDGE	FERRIC SULPHATE 12% SOLUTION	FERRIC SULPHATE 12% SOLUTION	LIME SLURRY 10% SOLIDS	LIME SLURRY 10% SOLIDS
TOTAL MASS DRY SOLIDS	59 kg/h	59 kg/h	59 kg/h	ø	ø	59 kg/h	ø	ø	11 kg/h	11 kg/h
FLOW RATE	450 m^3/h	450 m^3/h	453 m^3/h	452 m^3/h	449 m^3/h	0.8 m^3/h	0.028 m^3/h	0.028 m^3/h	0.11 m^3/h	0.11 m^3/h
	11	12	13	14	15	16	17	18	19	20
LINE	COAGULANT 0.05 wt%	COAGULANT 0.3 wt%	COAGULANT DILUTION WATER	LIME SLURRY RECIRCULATION	COAGULANT PREPERATION WATER	DRY COAGULANT	HYDRATED LIME (10 min. BATCH)	SLURRY WATER (10 min. BATCH)	WATER SUPPLY CONTINUOUS	HYDROGEN PEROXIDE
TOTAL MASS DRY SOLIDS	ø	ø	ø	1100 kg/h	ø	1.4 kg/h	6000 kg/h	ø	ø	ø
FLOW RATE	2.7 m^3/h	0.44 m^3/h	2.3 m^3/h	11 m^3/h	0.45 m^3/h	0.0018 m^3/h	12.5 m^3/h	54–57 m^3/h	3 m^3/h	0.0006 m^3/h

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APPROVED

No.	DATE	REMARKS	BY

CITY OF COPIOUS D'OR

ACME MINERAL RIGHTS LLC.

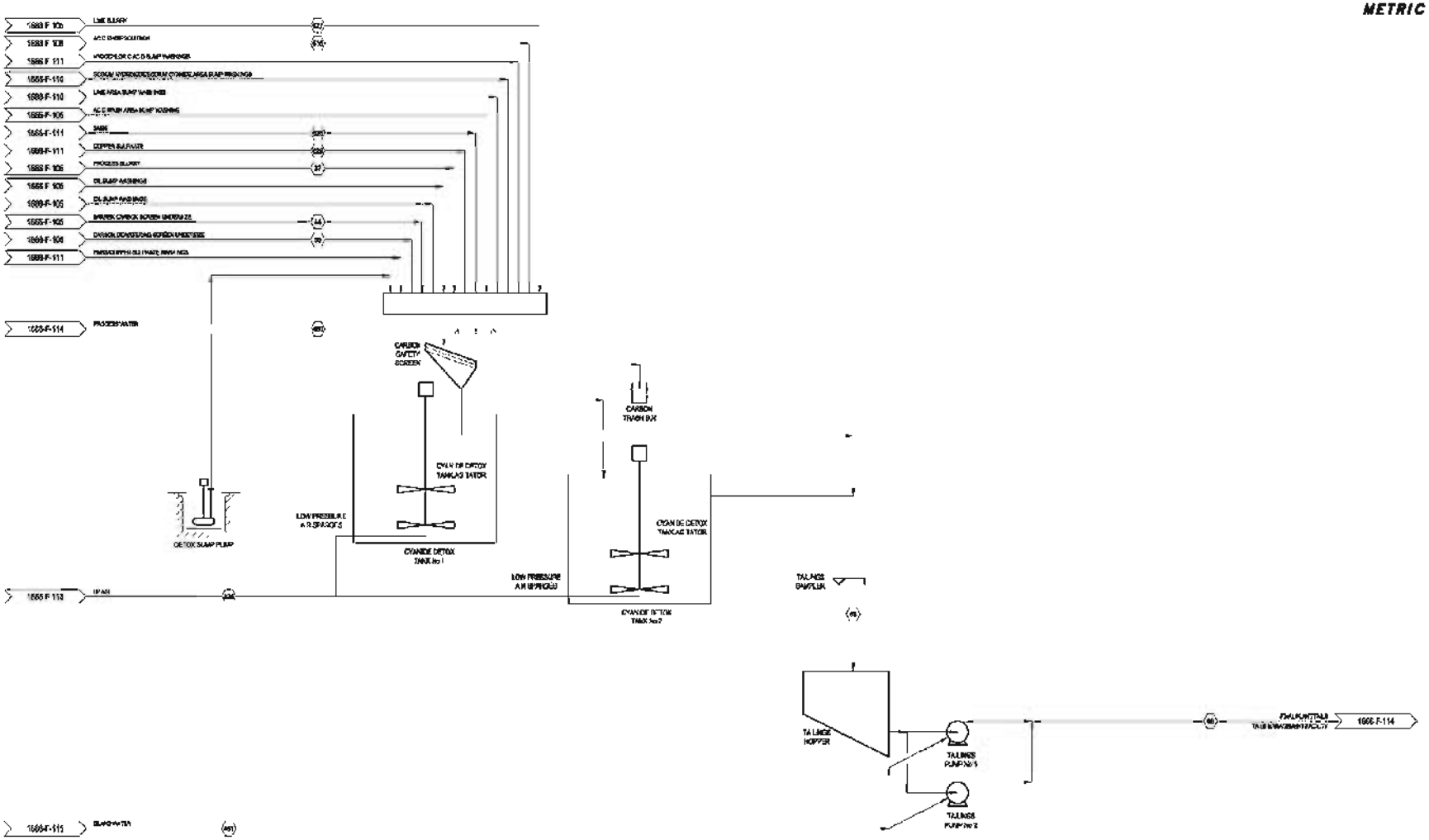
DATE AUG 2000
DESIGN AB
DRAWN DB
CHECKED JC

PRECIOUS METAL MINE PROJECT

FLOW DIAGRAM
EFFLUENT TREATMENT

SCALE NTS
DWG. NO. F-01
CONT. NO. A-01-00
SHEET NO. 00

METRIC



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CONSULTING LTD.

APPROVED

No.	DATE	REMARKS	BY

CITY OF COPIOUS D'OR

ACME MINERAL RIGHTS LLC.

DATE AUG 2000
DESIGN AB
DRAWN VK
CHECKED JC

PRECIOUS METAL MINE PROJECT

CYANIDE DETOXIFICATION AND TAILINGS DISPOSAL AREA PROCESS FLOW DIAGRAM

SCALE NTS
DWG. NO. F-04
CONT. NO. A-01-00
SHEET NO. SHEET No.

Attachment 7:

MOE Pipe Data Form, Watermain, Storm Sewer, Sanitary Sewer and Forcemain Design, Supplement to Application for Approval for Water and Sewage Works (PIBS 6238e)

Ministry of the Environment | Ministère de l'Environnement

Ontario

PIPE DATA FORM

WATERMAIN, STORM SEWER, SANITARY SEWER, AND FORCEMAIN DESIGN

SUPPLEMENT TO APPLICATION FOR APPROVAL FOR WATER AND SEWAGE WORKS

General:

Information requested in this form is collected under the authority of the *Ontario Water Resources Act* (OWRA), the *Safe Drinking Water Act* (SDWA), the Drinking-Water Systems Regulation (O. Reg. 170.03) and the *Environmental Bill of Rights* (EBR). This information will be used to evaluate applications for approval of municipal and private sewage works as required by section 53 of the OWRA and to evaluate applications for approval of municipal and non-municipal drinking-water systems as required by sections 31, 36, 38, 52 and 60 of the SDWA.

Instructions:

1. This form should accompany all applications for a Water and Sewage Works. It does not replace the application form for a Certificate of Approval and is required in addition to the supporting technical information described in the Guide for Applying for Municipal and Private Water and Sewage Works. All designs are expected to be in accordance with MOE design guidelines and the 10 State Standards, as updated from time to time.

2. The information contained in this form and the required supporting stamped engineering drawings are the minimum information requirements used to process the application for a Certificate of Approval. All sections MUST be filled out and incomplete forms will be RETURNED to the applicant.

3. Application forms and supporting documentation are available from the Environmental Assessment and Approvals Branch toll free at 1-800-461-6290 (locally at 416-314-8001), from your local District Office of the Ministry of the Environment, and in the "Publications" section of the Ministry of the Environment website at www.ene.gov.on.ca.

4. Questions regarding completion and submission of this data form should be directed to the Environmental Assessment and Approvals Branch, 2 St. Clair Avenue West, Floor 12A, Toronto, Ontario, M4V 1L5, 1-800-461-6290 or (416) 314-8001, or to your local District Office of the Ministry of the Environment.

INFORMATION FOR PROPONENTS APPLYING FOR A CERTIFICATE OF APPROVAL FOR WATER AND SEWAGE WORKS

Section 53 of the *Ontario Water Resources Act* and Part V of the Safe *Drinking Water Act* require that anyone who establishes, alters, extends or replaces new or existing water or sewage works shall do so only in accordance with approval granted by the Director. As a result, any plans to change watermains, storm sewers, sanitary sewers, or combined sewers must first be granted a Certificate of Approval (works which are exempt from Certificate of Approval requirements are detailed in Ontario Regulation 525/98). Detailed information on approval requirements and procedures is contained in separate documents entitled "Guide for Applying for Approval of Municipal and Private Water and Sewage Works (Section 53 *Ontario Water Resources Act*)" and "Guide For Applying For Approvals Related To Municipal And Non-Municipal Drinking-Water-Systems – Parts V and VI of the *Safe Drinking Water Act* and Drinking-Water Systems Regulation". These documents are available on the Ministry of the Environment's website (www.ene.gov.on.ca) or can be obtained by contacting a client services representative at (413) 314-8001.

CRITERIA FOR APPROVAL – WATER AND SEWAGE WORKS

The anticipated environmental impacts of water and sewage works are land and water contamination, or overflow causing physical damage, or resulting in adverse effect. Generally, these impacts can be minimized by appropriate design, installation, operation and maintenance of the water and sewage pipes. There are a number of assessment criteria, which will be explained in this data form, and which can be read in greater detail in the following guidelines, as updated from time to time:

- Guidelines for the design of water distribution systems, Ministry of the Environment, 1985
- Guidelines for the design of sanitary sewage systems, Ministry of the Environment, 1985
- Interim guidelines for the design of storm sewer systems, Ministry of the Environment, 1985
- Procedure for the Determination of Treatment Requirements for Municipal and Private Combined and Partially Separated Sewer Systems (Procedure F-5-5)
- Procedures to govern separation of sewers and watermains (Procedure F-6-1)

1.0 GENERAL PROJECT INFORMATION

1.1 Site Name: Precious Metals Mine

1.2 Municipality: Copious D'Or, North Nugget County, ON

Client (if different from Municipality): ACME Mineral Rights LLC

1.3 Type of Works Project (please check all that apply)

- [ ] Watermain — *Please complete Sections 1.0 to 5.0 of this form*
- [ ] Storm Sewer — *Please complete Sections 1.0 to 4.0, 6.0 and Appendix A of this form*
- [ ] Sanitary Sewer — *Please complete Sections 1.0 to 4.0, 7.0 and Appendix B of this form*
- [x] Forcemain — *Please complete Sections 1.0 to 4.0, 8.0 and Appendix C of this form*

1.4 (a) Project Purpose (please check all that apply)

- [ ] Replacement
- [ ] Increased demand
- [ ] Connecting existing lines
- [x] New development
- [ ] Other: _____

2.0 ENVIRONMENTAL ASSESSMENT ACT REQUIREMENTS

2.1 Is this a private sector project?

- [x] Yes
- [ ] No

If 'No' and not an MEA Class EA Schedule C Residential underdaking, please complete 2.2 and 2.3.

2.2 (a) Choose applicable Municipal sector Class EA Schedule

- [ ] Schedule A
- [ ] Schedule B
- [ ] Schedule C

(b) From the appropriate Schedule identified in 2.2(a), please identify Project Type and associated Schedule/Paragraph No. which applies to the proposed project

- [ ] Water Project
- [ ] Wastewater Project

Schedule No. _____

For 'Schedule B' please complete 2.3(a),(b) *For 'Schedule C', please complete 2.3(a),(b),(c)*

2.3 (a) Has a Notice of Completion been submitted along with this application?

- [ ] Yes
- [ ] No

(b) Were any Part II Orders (ie. "Bump-up" requests) received for this project?

- [ ] Yes
- [ ] No

If 'Yes', please provide details: _____

(c) Has an Environmental Study Report (ESR) been completed?

- [ ] Yes
- [ ] No

If 'Yes', please include ESR Cover page with this submission

3.0 DRAWINGS

NOTE: All drawings must include an accurate scale and be stamped by a Professional engineer. If the drawing is of a large scale where small separation distances cannot be easily measured, these distances must be marked on the drawing or noted as a typical separation.

Have the following details been included with this submission?

- [x] *Site Plan, including*
  - [x] Proposed works
  - [ ] Existing works (as appropriate)
  - [ ] Property lines/Municipal boundaries
  - [ ] Any water bodies in proximity to the works
- [x] *Plan and Profile of all Pipes*
  - [ ] Horizontal distance between watermains and sewers
  - [ ] Vertical distance between watermains and sewers
  - [x] Length, diameter and slope of each pipe segment
  - [x] Locations of valves, valve chambers if > 300mm diametre, pressure reducers, tees, etc
  - [ ] Location of manholes (and their respective IDs)
- [ ] *Storm Drainage Area*
  - [ ] Indicate all areas which drain into the proposed works
  - [ ] Physical area in hectares
  - [ ] Runoff Coefficient for each drainage area
  - [ ] Storm water drainage path
- [ ] *Sanitary Drainage Area*
  - [ ] Indicate all areas which drain into the proposed works
  - [ ] Physical area in hectares
  - [ ] Population for each drainage area
  - [ ] Sanitary Sewer drainage path
- [x] *Other Details*
  - [ ] Typical separations, where not easily measured from pipe drawings
  - [x] Appertunances
  - [ ] Municipal drains

4.0 ADDITIONAL INFORMATION

4.1 Are the proposed works laid below the frost penetration depth for the area at all points?

[x] Yes [ ] No

4.2 (a) Are all existing and proposed watermains separated by at least 2.5 m of clear horizontal distance from all existing and proposed sewers and storm water conveyance systems (ie. ditches)?

[x] Yes [ ] No

(b) Are all existing and proposed watermains separated by at least 0.5 m of clear vertical distance higher than all existing and proposed sewers and storm water conveyance systems (ie. ditches)?

[x] Yes [ ] No

(c) Are all existing and proposed sewers, including all drains and similar sources of contamination, separated by at least 15 metres from potable water reservoirs below normal ground surface and well supplies?

[x] Yes [ ] No

If 'No' to any part of Question 4.0, please refer to Procedure F-6-1 for solutions to prevent contamination when separation distances cannot be met

5.0 WATERMAINS

For Questions 5.1 to 5.3, please attach an additional sheet if necessary

5.1 Description of Proposed Watermain(s) (including service area/development)

5.2 Description of Existing Works (in proximity to proposed works)

5.3 For each watermain, please provide the following details in the chart below (or equivalent)

STREET	FROM (street/manhole)	TO (street/manhole)	DIAMETER (mm)	ROUGHNESS

5.4 Are all of the watermains a minimum of 150 mm in diameter?

☐ Yes ☐ No

5.5 What is the expected operating pressure range for this watermain under maximum day demand?

_____ to _____ *(please indicate units)*

5.6 (a) Will the watermain pressure drop below 275 kPa (40 psi)?

☐ Yes ☐ No

If 'Yes', please provide an explanation for this situation and future plans to address the problem:

(b) Is there sufficient pressure (138 kPA or 20 psi) reserved for fire flow/protection?

☐ Yes ☐ No

5.7 If this is a feedermain or a pipe dedicated to transporting potable water only (ie. having no service connections), have hydraulic transients been considered?

☐ Yes ☐ No

If 'Yes', please describe the results:

5.8 (a) Are there any dead end points in the system?

☐ Yes ☐ No *If 'Yes', then please complete 5.8(b)*

(b) How will water stagnation be addressed?

☐ Fire Hydrants ☐ Blow-off point ☐ Other _____

5.9 (a) Are there any tee- or cross-connections?

☐ Yes ☐ No *If 'Yes', then please complete 5.9(b)*

(b) Are there at least two (2) shut-off valves at each tee-connection, and at least three (3) shut-off valves at each cross-connection?

☐ Yes ☐ No

If 'No', how will disruptions to the system be minimized during repairs or emergencies?

6.0 STORM SEWERS

For Questions 6.1 to 6.3, please attach an additional sheet if necessary

6.1 Description of Proposed Storm Sewer(s) (including service area/development)

6.2 Is this application for approval a part of a larger and/or phased development?

☐ Yes ☐ No

If 'Yes', please provide full details on any existing developments including all Certificates of Approval that have been approved or application that are currently under review. Clearly indicate in all stamped engineering drawings and reports which developments belong to which phase and whether they are existing, for current development, or for future development.

(please attach another sheet if necessary)

6.3 Description of Existing Works (in proximity to proposed works)

6.4 For each storm sewer, please provide the following details in the chart below (or equivalent)

STREET	FROM (street/manhole)	TO (street/manhole)	DIAMETER (mm)	ROUGHNESS

6.5 Has the Storm Sewer Hydraulic Design Sheet (or equivalent) been included with this submission? (refer to the Guidance Document in Appendix A)

☐ Yes ☐ No

6.6 Please indicate which land use surface types are included in the drainage area and list the runoff coefficient(s) used for each type

SURFACE TYPE	RECOMMENDED	USED
☐ Asphalt, concrete, roof areas	0.90 - 1.00	
☐ Gravel	0.80 - 0.85	
☐ Grassed areas, parkland	0.15 - 0.35	
☐ Commercial	0.75 - 0.85	
☐ Industrial	0.65 - 0.75	
☐ Single family dwelling	0.40 - 0.45	
☐ Semidetached	0.45 - 0.60	
☐ Row housing, Townhousing	0.50 - 0.70	
☐ Apartments	0.60 - 0.75	
☐ Institutional	0.40 - 0.75	
☐ Other		

If **USED** *runoff coefficient does not fall within the* **RECOMMENDED** *range, please provide rationale below:*

6.7 (a) What is the full flow velocity range for all storm sewers in the proposed works?

_____ to _____ m/s

(b) If the full flow velocity is outside of the range of 0.8 m/s to 6.0 m/s, what measures will be employed to reduce sediment build up and/or erosion in the pipe?

_____

_____

6.8 (a) What is the municipality's requirement for the minor design storm event?

☐ 2 year ☐ 5 year ☐ 10 year ☐ Other _____

(b) What storm event has been used for the design of the proposed works?

☐ 2 year ☐ 5 year ☐ 10 year ☐ Other _____

(c) Are there any inlet control devices (ICDs) proposed in the catch basins?

☐ Yes ☐ No

6.9 Please indicate the first destination/location that will be receiving the storm water:

☐ Natural Water Body Name: _____

Has the Conservation Authority granted approval to discharge to this water body?

☐ Yes ☐ No

☐ Storm Water Management (SWM) Facility Name: _____

Certificate of Approval No. (if applicable): _____ OR,

Application Reference No. (if submitted): _____

Has the Operating Authority (of the SWM facility) granted approval to discharge to this facility?

☐ Yes ☐ No

☐ Municipal Drain

☐ Existing Sewers

7.0 SANITARY SEWERS

For Questions 7.1 to 7.3, please attach an additional sheet if necessary

7.1 Description of Proposed Sanitary Sewer(s) (including service area/development)

7.2 Description of Existing Works (in proximity to proposed works)

7.3 For each sewer, please provide the following details in the chart below (or equivalent)

STREET	FROM (street/manhole)	TO (street/manhole)	DIAMETER (mm)	ROUGHNESS

7.4 Has the Sanitary Sewer Design Sheet (or equivalent) been included with this submission? (refer to Guidance Document in Appendix B)

☐ Yes ☐ No

7.5 Please indicate which sewage types are applicable in the drainage area and list the daily design flows used in the pipe design for each type

	SEWAGE TYPE	RECOMMENDED	USED
☐	Domestic	225 - 450 L/cap/day	
☐	Hospitals	900 - 1800 L/bed/day	
☐	Schools	70 - 140 L/student/day	
☐	Trailer Parks	340 - 800 L/space/day	
☐	Infiltration	0.1 - 0.28 L/ha/s	
☐	Industrial	35 - 55 m3/ha/day	
☐	Shopping Centres	2500 - 5000 L/1000 m2/day	
☐	Hotels/Motels	150 - 225 L/bed space/day	
☐	Other		

If **USED** *sewage daily design flow does not fall within the* **RECOMMENDED** *range, please provide rationale below:*

7.6 (a) What is the full flow velocity range for all sanitary sewers in the proposed works?

_____ to _____ m/s

(b) If the full flow velocity is outside of the range of 0.6 m/s to 3.0 m/s, what measures will be employed to reduce sewage build up and/or erosion in the pipe?

7.7 It is recommended that sanitary sewers be laid at sufficient depth to receive gravity flow from basements. Are any sanitary sewers above the depth of any basements in the area?

☐ Yes ☐ No

If 'Yes', what methods will be employed to prevent sewage backup into basements?

8.0 FORCEMAINS

For Questions 8.1 to 8.3, please attach an additional sheet if necessary

8.1 Description of Proposed Forcemain(s) (including service area/development)

Proposed works include a pumping station and forcemain (250 mm HDPE) to transfer water from the reclamation pond for use in processing.

8.2 Description of Existing Works (in proximity to proposed works)

None.

8.3 For each forcemain, please provide the following details in the chart below (or equivalent)

STREET	FROM (street/manhole)	TO (street/manhole)	DIAMETER (mm)	ROUGHNESS
N/A	N/A	N/A	250mm	120

8.4 (a) Is there an existing Certificate of Approval for the pumping station associated with this forcemain?

☐ Yes ☒ No

If 'Yes', please provide the Certificate of Approval No.: _____

If 'No', please complete 8.4(b)

(b) Please provide the pumping station design elements by completing Tables 1, 2, and 3 in Appendix C Have Tables 1, 2, and 3 been included with this submission?

☒ Yes ☐ No

8.5 If this system is **not** a grinder pump system, is the minimum pipe size at least 100 mm to allow for the passage of small solids?

☒ Yes ☐ No

If 'No', please indicate below which methods will be employed to prevent a blockage in the pipe

8.6 (a) What is the velocity range for all forcemains in the proposed works?

1.1 to 1.3 m/s

(b) If the velocity falls outside of the range of 0.8 m/s to 2.5 m/s, what measures will be employed to reduce sewage build up and/or erosion in the pipe?

N/A

8.7 Have the effects of hydraulic transient been considered?

☐ Yes ☒ No

If 'Yes', please indicate the results below:

APPENDIX A - SAMPLE TEMPLATE

STORM SEWER HYDRAULIC DESIGN SHEET

Checking Date:

Site location (City) **n=** Reviewer:

Ref# **Design Storm: The Year Storm Event**

Rational Formula: Q = 2.78*CIA

Where: Q: peak flow (L/s)
C: runoff coefficient
I: rainfall intensity (mm/h)
A: area (ha)

Concentration time: $t_c = t_i + t_f$ (minute)

Where: t_i: inlet time before pipe (minute)
t_f: time of flow in pipe (minute)
$t_f = L/(60V)$ (minute)

Manning Equation:
Qcap. = (D/1000)^2.667*(S/100)^0.5/(3.211*n)*1000 (L/s)
D: pipe size (mm)
S: slope (grade) of pipe (%)
n: roughness coefficient

			Runoff							Pipe						
Street	From	TO	Area		Section	Accum.			peak Flow	Length	Slope	N. D.	Qcap.	V		
Name			A	C	AC	AC	t_c	"I"	Q	L	S	D	(full)	(full)	t_f	Q/Qcap.
	MH/CB	MH/CB	(ha)		(ha)	(ha)	(Min.)	mm/hr	(L/s)	(m)	%	(mm)	(L/s)	(m/s)	(Min.)	

APPENDIX B - SAMPLE TEMPLATE

SANITARY SEWER DESIGN SHEET

Review Date:

Site location (City)

n=

Reviewer:

Ref#

Residential Unit average daily flow (q): L/cap.d (225~450 L/cap.d)

Unit extraneous flow (E): L/s/ha (0.1-0.28L.s.ha)

q = average daily per capita flow (L/cap.d)
I = Unit of peak extraneous flow (L/s/ha)
Q(p) = peak population flow (L/s)
Q(I) = peak extraneous flow (L/s)
Q(d) = peak design flow (L/s)

Peaking Factor:
M =1+14/(4+(P/1000)^0.5)
Q(p) = (P/1000)qM/86.4 (L/s)
Q(I) =IA (L/s); where A = Area in hectares
Q(d) = Q(p) + Q(I) (L/s)

Manning Equation:
Qcap. = (D/1000)^2.667*(S/100)^0.5/(3.211*n)*1000 (L/s)
D: pipe size (mm)
S: slope (grade) of pipe (%)
n: roughness coefficient

			Inlet Flow								Pipe					
Location			Individual		Accumulative		Peaking	Pop.	Extran.	Design	Length	Size	Slope	Capacity	Velocity	
Street Name	From	To	P	Area	P	Area	Factor	Q(p)	Q(e)	Q(d)	L	D	S	Qcap.	V	Q(d)/Qcap
	MH	MH	(person)	(ha)	(person)	(ha)	M	(L/s)	(L/s)	(L/s)	(m)	(mm)	(%)	(L/s)	(m/s)	

APPENDIX C

TABLE 1: SEWAGE PUMPING STATION DESIGN

Municipality: Copious D'Or

Pumping Station Name: Pumping Station 3

Designed by: A. Engineer Date:

DESIGN SUBJECT		UNIT	INITIAL PERIOD	10 YEAR PERIOD	20 YEAR PERIOD	ULTIMATE PERIOD
TRIBUTARY	A) Residential	ha				N/A
	B) Commercial	ha				N/A
	C) Industrial	ha				N/A
POPULATION DENSITY		Pers/ha				N/A
POPULATION OR EQUIVALENT	A) Residential	No.				N/A
	B) Commercial	No.				N/A
	C) Industrial	No.				N/A
PER CAPITA FLOW		L/cap.d				N/A
AVERAGE FLOW		L/s				50
PEAK FLOW FACTOR*						1.2
PEAK DOMESTIC FLOW		L/s				N/A
INFILTRATION RATE		L/ha.s				N/A
INFILTRATION FLOW		L/s				N/A
DESIGN PEAK FLOW (INLET SEWER)		L/s				60
PUMPS		No.				2
PUMP DISCHAGE		L/s				65
FORCE MAIN DIAMETER		mm				250
VELOCITY		m/s				1.1 to 1.3

Note:

* The peak flow factor is: 1+14/(4+P^0.5), where P is designed population, in thousand.

APPENDIX C

TABLE 2: SEWAGE PUMPING STATION DESIGN

Municipality: Copious D'Or

Pumping Station Name: Pumping Station 3

Designed by: A. Engineer Date:

DESIGN SUBJECT		UNIT	C=120	C=130	C=140
PUMP DESIGN FLOW		L/s	65	65	65
FORCEMAIN DIAM.		mm	250	250	250
VELOCITY		m/s	0.9	0.9	0.9
FORECEMAIN LENGTH		m	4000	4000	4000
FORCEMAIN HEAD LOSS		m	36.4	31.3	27.3
SUCTION LINE HEAD LOSS		m	0.5	0.5	0.5
DISCHAGE LINE HEAD LOSS		m	0.5	0.5	0.5
TOTAL HEAD LOSS		m	37.4	32.3	28.3
LOW WATER LEVEL WET WELL		m	118.0	118.0	118.0
HIGH WATER LEVEL WET WELL		m	123.5	123.5	123.5
FORCEMAIN END ELEVATION		m	134.0	134.0	134.0
STATIC HEAD	MAX.	m	16.0	16.0	16.0
	MIN.	m	10.5	10.5	10.5
TOTAL DANAMIC HEAD	MAX.	m	53.4	48.3	44.3
	MIN.	m	47.9	42.8	38.8

APPENDIX C

TABLE 3: INFORMATION REQUIRED FOR SEWAGE PUMPING STATIONS APPLICATIONS

Standby Power Supply

Is standby power required?

- [X] Yes
- [ ] No

If yes, what kind of standby power is available for this pumping station?

- [ ] a) Standby Generator
- [X] b) Portable Generator
- [ ] c) Additional hydro feed line

Receiving Watercourse

Will sewage be overflow/bypass any receiving watercourse?

- [ ] Yes
- [X] No

If yes, then:

a) It will be necessary to know in detail the route by which overflow/bypass flow would gain access to the watercourse?

b) The flow in the receiving watercourse at the point of overflow/bypass from the pumping station is as follows:

_____ flow in dry weather (m3/s)

_____ flow in wet weather (m3/s)

c) The nearest water intake is located on the receiving watercourse within

_____ metres of the point of entry of the overflow.

Sewage Pumping Station

a) The operating authority responsible for maintenance and operation of this pumping station is

_____

b) The high level alarm is set up to relay a signal to: _____

c) Between the time of activation of the high level alarm and the overflow/basement flooding, there are:

_____ m3 of storage capacity available in the sewers;

_____ m3 of storage capacity available in the pumping station.

d) This storage will provide:

_____ minutes retention before overflow/basement flooding occurs at the average daily design flow of _____ L/s; and

_____ minutes retention before overflow/basement flooding occurs at the peak design flow of _____ L/s.

e) It is possible to bypass or pump around the pumping station with portable equipment by utilizing the following procedure:

_____

_____

Attachment 8:

Description of Proposed Works (Hard copy and Electronic copy)

SAMPLE PROJECT DESCRIPTION

The establishment of sewer works for the collection, transmission, treatment and disposal of mill slurry process water, surface runoff, mine dewatering, and sanitary sewage, serving a gold mining and mill complex processing gold ore using the carbon-in-leach (CIL) gold recovery process, located at Neighbour Lake, near the town of Copious d'Or, North Nugget County, ON. The processing plant will operate on a continuous basis, averaging 333 days per year for an expected Mine processing life of 5.1 years.

A. TAILINGS MANAGEMENT FACILITY (TMF)

Tailings Dams

- Dams will have 6 m core constructed of compacted clay keyed 1.5 m into bedrock or impermeable soils.
- Lining for the dammed area will be constructed from local clay and imported clay as necessary for leakage prevention where local soil does not provide an impermeable barrier.
- Dam structures will range from 6 to 16 m with a perimeter length of approximately 4,000 m around the Tailings and Water Reclamation Ponds. Leakage is estimated to occur at 18 m^3/km/day. The minimum final crest width will be 8 m.
- Divider dykes will be placed between the Tailings and Water Reclamation Ponds, and between Settling Pond and Polishing/Holding Pond. Construction will allow water to pass through while retaining solids.
- Seepage collection ditches surround the dam structures. They will be clay lined and armoured to prevent erosion and follow natural topography to collect water at a natural low point. Water will be removed from ditches with a portable pump on an as needed basis.

Tailings Pond

- Will receive tailings from the Cyanide Detoxification Process, Elution Circuit, all site run off including water collected from stockpiles, equipment washing, and water extracted from within the mine. Waters received will meet the MISA and MMER for all chemicals accept arsenic.
- Two pipelines will discharge water. They will be the Tailings Line and Pit Dewatering Line constructed of HDPE pipe with diameters of 250 mm and 100 mm, respectively.
- Roaming outfall to be utilized along the dam structures to improve water separation rates and solids consolidation rates within the tailings pond. Discharge will be move 100 m approximately every 14 days. Buildup of solids along dam structure will improve the dam integrity for possible future expansion.
- Lining to be constructed from local clay and imported clay as necessary for leakage prevention where local soil does not provide an impermeable barrier.

Water Reclamation Pond

- Will receive water from the Tailings Pond. Most solids are settled by this stage.
- Water will be sent to Process Water Pond for reuse as needed (e.g. during drought conditions) or directed to the Effluent Treatment/Arsenic Reduction Facility.
- A rock filled causeway and tower around perforated concrete culvert which submersible sump placed in the culvert to remove water.
- The Water Reclaim Pond spillway will be a reinforced concrete trough installed in the crest of the dam at the southwest corner of the Water Reclaim Pond and will measure 0.65 m deep and 4.0 m in width with a concrete thickness of 0.5 m. The pond is to be relocated with each dam rise.
- An additional spillway of similar construction will provide for overflow capacity back into the holding pond.

Process Water Pond

- Will receive water from plant runoff and the Water Reclamation Pond.
- Water will be recirculated to the ore processing unit.
- Spillway construction will be similar in construction to Water Reclamation Pond spillway with a 2 m extension into the dam.

B. POLISHING/HOLDING POND

Dams

- Construction similar to that used through out the TMF.
- Height will be 4-6 m and length of 750 m, making use of a natural embankment on the western side.

Effluent Treatment/Arsenic Reduction Facility

- Water will enter the Polishing/Holding Pond after passing from the Water Reclamation Pond through the Arsenic Reduction Facility
- Treated waters will meet the MISA and MMER for all chemicals.

Settling Pond

- Dyke will separate the Settling Pond from the Polishing/Holding Pond.
- Dyke construction will not prevent water from passing through the dyke but will contain solids to the Settling Pond area. Solids will primarily enter the Settling Pond only during the construction phase.

Storage Tank for Special Uses

- Water can be diverted from the Polishing/Holding Pond to the Storage Tank for special uses.
- Water from this tank will be used in gland seal pumps and reagent mixing.

Cascade Aerator

- CW will leave the Polishing Pond via an integrated spillway/cascade aerator. The cascade aerator will be a series of concrete steps 0.7 m high and 14 m wide, which will create turbulent flow, oxygenating the water and promoting the oxidation of ferric iron and ammonia.

C. NATURAL AND CONSTRUCTED WETLANDS

Constructed Wetland

- Will cover an area of 15 ha and will be located southeast of the Polishing/Holding Ponds.
- Water will discharge into a 1 ha surge pond (forebay), where sediment will settle and water will feed the first cell.
- Will provide the effluent with additional treatment capacity through the application of natural biochemical processes to the Polishing Ponds effluent.
- The Constructed Wetland is expected to reduce dissolved arsenic and ionized ammonia by 30% and dissolved metal concentrations (Al, Fe, Cu, and Pb) by 50% or more

Weir Outfall to Natural Wetlands

- Final effluent discharge point.
- A weir outfall will control flow out of Constructed wetland to control

Natural Wetlands

- The lakeshore buffer zone will not be cleared, allowing it to remain in its natural state.

D. SANITARY SEWER SYSTEM

Potable Water

- Potable water will be trucked onto the site.

Septic Systems

- Septic systems will be installed in all employee rest areas.
- A bed-less system will be used in low usage areas and pumped as required.
- Tank and leach-bed systems will be installed where possible and capacity necessitates.

E. OTHER SEWER WORKS

Mill Operation

- Water from the Water Reclamation Pond and the Settling Pond will be extracted and routed to the Mill for various operations (CIL, elution).
- Water will be transported in HDPE piping to the Mill.
- All water will be returned to the TMF.

Attachment 9:

Proof of Source Water Protection Consultation

CONSULTING LTD.

123 Office Drive, Someplace, ON
Telephone: 123-555-1234
Fax: 123-555-5678

MEMORANDUM

TO File **DATE** May 5, 2009

CC Peter Protector, North Nugget Neighbour Lake Source Protection Committee

FROM Jo Consultant, Consulting Ltd. **DOCUMENT No.** 09-7654

ACME MR PRECIOUS METALS MINE: SOURCE WATER PROTECTION CONSULTATION

A meeting was held on May 1, 2009 to review the potential impacts of the ACME MR Precious Metals Mine project on drinking water sources in the North Nugget Neighbour Lake Source Protection Area.

As part of the province's drinking water source protection initiative, the North Nugget Neighbour Lake Source Protection Committee has developed the North Nugget Neighbour Lake Source Protection Plan. The plan aims to implement strategies for safeguarding the watershed's surface and groundwater sources from contamination and overuse.

Consulting Ltd. briefly outlined the details of the ACME MR expansion project and discussed measures taken to protect the Neighbour Lake Area from wastewater leakage into groundwater.

P. Protector confirmed that the proposed project includes all measures necessary to conform to applicable policies in the North Nugget Neighbour Lake Source Protection Plan.